123554

Record of Decision

Operable Unit 3 Groundwater

Cornell-Dubilier Electronics, Inc. Site

South Plainfield Borough, Middlesex County, New Jersey

United States Environmental Protection Agency

Region 2

September 2012

DECLARATION STATEMENT
RECORD OF DECISION

SITE NAME AND LOCATION

Cornell-Dubilier Electronics, Inc., Site (EPA ID#NJD981557879)
Borough of South Plainfield, Middlesex County, New Jersey
Operable Unit 3

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedy to address contamination in groundwater at the Cornell-Dubilier Electronics, Inc., (CDE) Superfund site, in South Plainfield, New Jersey, Middlesex County, New Jersey. The selected remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record established for this site.

The New Jersey Department of Environmental Protection (NJDEP) concurs with the selected remedy.

ASSESSMENT OF THE SITE

The response action selected in the Record of Decision (ROD) is necessary to protect public health or the environment from actual or threatened releases of hazardous substances from the site into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The response action described in this document represents the third remedial phase for the site, designated Operable Unit 3 (OU3). It addresses the groundwater, and is considered a final action for the groundwater portions of the site, with the following exception: in response to public comment, the selected remedy defers action on the area of the groundwater that has the potential to discharge to Bound Brook. EPA will evaluate additional information collected as part of the decision-making for the Bound Brook study area, Operable Unit 4 (OU4) of the site. The components of the selected remedy include:

- Prevention of exposure to site groundwater contamination, by continuing efforts to identify existing private wells within the OU3 study area, and by placing institutional controls in the form of a Classification Exception Area to prevent the installation of new drinking water wells;

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- Implementation of a long-term sampling and analysis program to monitor the groundwater contamination at the site, in order to prevent exposure and assess groundwater migration; and

- Implementation of a long-term vapor intrusion monitoring program.

EPA evaluated alternatives for restoration of groundwater to meet Applicable or Relevant and Appropriate Requirements (ARARs) and concluded that no practicable alternatives could be implemented. Consequently, EPA is invoking an ARAR waiver for the groundwater at the site, except for the above-deferred area, due to technical impracticability (TI). A TI determination for the area of groundwater for which EPA is deferring selecting an action will be made as part of the remedy selection process for OU4.

DECLARATION OF STATUTORY DETERMINATIONS

Part 1: Statutory Requirements

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost effective, and utilizes permanent solutions and treatment technologies to the maximum extent practicable.

Part 2: Statutory Preference for Treatment

The selected remedy does not satisfy the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

Part 3: Five-Year Review Requirements

Because the remedy will result in hazardous substances, pollutants, or contaminants remaining above levels in groundwater that allow for unlimited use and unrestricted exposure, a statutory five-year review will be conducted within five years after the initiation of the remedial action, to ensure the remedy continues to provide adequate protection of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for the site.

- Chemicals of concern and their respective concentrations may be found in the "Site Characteristics" section.

- Baseline risk represented by the chemicals of concern may be found in the "Summary of Site Risks" section.

- A discussion of remediation goals may be found in the "Remedial Action Objectives" section.

- A discussion of source materials constituting principal threats may be found in the "Principal Threat Waste" section.

- Current and reasonably anticipated future land use assumptions are discussed in the "Current and Potential Future Site and Resource Uses" section.

- A discussion of potential uses for groundwater that will be available at the site as a result of the selected remedy may be found in the "Remedial Action Objectives" section.

- Estimated capital, annual operation and maintenance (O&M) and total present worth costs are discussed in the "Description of Alternatives" section.

- Key factors that led to selecting the remedy (i.e., how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

Walter E. Mugdan
Walter E. Mugdan, Director
Emergency & Remedial Response Division
EPA - Region 2

September 30, 2012
Date

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SITE NAME, LOCATION AND BRIEF DESCRIPTION

The Cornell-Dubilier Electronics, Inc., (CDE) site consists of contamination from former industrial activities at 333 Hamilton Boulevard, South Plainfield, Middlesex County, New Jersey. The former CDE facility, most recently known as the Hamilton Industrial Park, was occupied by Cornell-Dubilier Electronics, Inc., from 1936 to approximately 1962. The fenced 26-acre lot is now vacant, covered by an asphalt cap. It is bounded on the northeast by the Bound Brook and Conrail tracks; on the southeast by the Bound Brook and a property used by the South Plainfield Department of Public Works; on the southwest, across Spicer Avenue, by single family residential properties; and to the northwest, across Hamilton Boulevard, by mixed residential and commercial properties, as shown on Figure 1 (found in Appendix I). Figure 1 shows the location of the former facility, which is Operable Unit 2 (OU2) of the site. Operable Unit 1 (OU1, discussed in more detail below) includes a number of residential and commercial properties near the former facility that were contaminated by soil and dust generated at the facility that spread to these nearby properties.

Figure 2 shows the extent of Operable Unit 3 (OU3), the subject of this Record of Decision (ROD). The total land area of OU3 encompasses approximately 825 acres, which consists of the observed extent of site-related volatile organic compounds (VOCs) found in groundwater. Figure 3 shows the Bound Brook study area, Operable Unit 4 (OU4) of the site.

The original facility, a complex that eventually grew to 18 buildings, was built in the early 1900s by Spicer Manufacturing Corporation, later known as Dana Corporation (Dana), a manufacturer of automobile components. Dana moved its operations to the Midwest in the 1920s and first leased, then sold the facility to CDE. (Dana filed for bankruptcy in 2006.) During CDE's occupancy of the site, the company manufactured electronic components including, in particular, capacitors. Polychlorinated biphenyls (PCBs) and the degreasing solvent trichloroethylene (TCE) were used in the manufacturing process, and the company disposed of PCB- and TCE-contaminated material directly on the facility soils.

CDE's activities led to widespread chemical contamination at the facility, as well as migration of contaminants to areas adjacent to the facility. TCE and PCBs have been detected in the groundwater and soils, and the now-demolished on-site buildings were contaminated with PCBs. In addition, PCBs have been found on adjacent residential, commercial, and municipal properties, and in the surface water and sediments of the Bound Brook.

From the time of CDE’s departure from the facility in 1962 until the closure and demolition of the buildings in 2007, the facility was operated as a rental property, the Hamilton Industrial Park, with over 100 commercial and industrial companies occupying the facility as tenants. Commercial and industrial operations since 1962 may have contributed to some site contamination, but the PCB and VOC contamination appears to be attributable to CDE’s activities.

The CDE site is on the U.S. Environmental Protection Agency’s (EPA’s) National Priorities List (NPL). EPA is the lead agency, and the New Jersey Department of Environmental Protection (NJDEP) is the support agency.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Operations and State and Federal Response Actions

NJDEP performed a site inspection in 1996, collecting a number of environmental samples that were found to contain PCBs. In June 1996, at the request of NJDEP, EPA collected soil, surface water and sediments at the facility, revealing elevated levels of PCBs, VOCs, and metals. In March 1997, EPA ordered the owner of the property, D.S.C. of Newark Enterprises, Inc. (DSC), a potentially responsible party (PRP), to perform a removal action. The removal action included paving driveways and parking areas in the industrial park, installing a security fence, and implementing drainage controls to mitigate risks associated with contaminated soil and surface water runoff from the facility. This work was substantially completed by early 2008.

In 1997, EPA conducted a preliminary investigation of the Bound Brook to evaluate potential contamination from the site. Elevated levels of PCBs were found in fish and sediments of the Bound Brook, leading to an NJDEP-issued fish consumption advisory for the Bound Brook and its tributaries, including nearby New Market Pond and Spring Lake. These advisories remain in effect today.

Also in 1997, EPA tested residential and commercial properties in the blocks nearest the CDE facility. At several of the properties tested, PCBs were found in soil and interior dust that posed a potential health concern for residents of those properties. These investigations led to removal actions at a total of 15 residential properties, conducted from 1998 to 2000 and again in 2004. The removal actions included surface soil excavation (performed by several of the site PRPs and, in one case, by EPA's Removal Program) and interior dust cleaning (performed by EPA's Removal Program).

In July 1998, EPA included the site on the NPL.

OU1 Remedy and Remedial Action

In 2000, as part of the first Remedial Investigation and Feasibility Study (RI/FS) for the site, EPA expanded the investigations initiated by EPA's Removal Program by collecting soil and interior dust samples from properties further from the CDE facility. During the OU1 RI, EPA tested individual properties and performed a right-of-way survey that expanded the area tested from the nearest blocks (Hamilton Boulevard, Spicer and Delmore Avenues), addressed in the initial removal actions at residential properties, to approximately seven blocks from the facility. Because PCBs were found in Bound Brook, EPA also expanded the testing to residential areas that bordered the Brook downstream from the facility.

The RI sampling found only sporadic detections of PCBs – 807 samples were collected during the RI, with only 25 detections over 1 milligram per kilogram (1 mg/Kg) total PCBs. PCBs were found only at shallow depths (generally in the first two feet of soil) suggesting that the PCBs on the nearest properties (addressed by the removal actions) had come from wind-blown dust from the facility. The RI/FS did identify three additional properties with elevated levels of PCBs in soil, and the investigation revealed some areas requiring further testing.

In September 2003, EPA selected a remedy to address PCB-contaminated soil and interior dust at properties in the vicinity of the former CDE facility, with concurrence from NJDEP. The remedy requires the excavation, off-site transportation and disposal of PCB-contaminated soil, and property restoration. The remedy also calls for interior dust cleaning at properties where PCBs are found indoors.

Using Federal and State funds, EPA began remediating the first OU1 properties in 2005. The Record of Decision (ROD) identified four properties; however, testing identified PCBs on an adjoining lot, and the action was expanded to address that property as well. Approximately 2,300 cubic yards of contaminated soil were excavated from the five properties.

In 2008, EPA began testing the additional areas identified in the OU1 ROD as needing further testing. This testing has encompassed over 60 properties to date, and is nearly complete. Thus far, eight additional properties have been identified for cleanup, bringing the current total to be addressed by the OU1 remedy to 12. The cleanup of these additional properties began in August 2012 and will take approximately four months to complete. Investigations are still being performed on several additional properties as part of OU1. EPA expects to complete the OU1 property investigations in 2012.

OU2 Remedy and Remedial Action

EPA began the RI/FS for the 26-acre facility in 2001. This investigation included soil and building testing and the installation of groundwater monitoring wells to assess the extent of the groundwater contamination at the site. While a variety of other contaminants of concern were identified, such as lead and arsenic, the primary contaminants of concern (in terms of risk posed and extent of contamination) were PCBs and TCE.

PCB-contaminated dust and building materials were found at unacceptable levels in the facility buildings. Most of the buildings were occupied while EPA was conducting the RI/FS, and EPA advised the property owner and tenants how to minimize the potential for exposure until a remedy could be selected and implemented.

Soil testing was performed in the overburden soils to bedrock, which was encountered as deep as about 15 feet below ground surface (15 feet bgs)) in the rear of the facility. Extensive fill areas containing thousands of discarded capacitors were found in the rear, undeveloped portion of the facility property.

In evaluating remedies for the site, EPA identified the "principal threats" posed by the site to be soils and debris contaminated with PCBs in excess of 500 mg/Kg, or TCE in excess of 1 mg/Kg[1]. EPA has developed guidelines for when to identify PCBs as principal threats, and TCE was targeted as a potential mobile source of groundwater contamination. The OU2 RI/FS estimated that as much as 115,000 cubic yards of soil and debris

[1] The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or acts as a source for direct exposure. Principal threat materials are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur.

exceeded these thresholds. Further, concentrations of PCBs in nearly all of the soil samples collected at the former facility exceeded 10 mg/Kg total PCBs, an EPA cleanup guideline for commercial or industrial reuse.

The OU2 RI/FS also identified extensive groundwater contamination, from both TCE and PCBs, with TCE extending off the former CDE facility property. EPA elected to complete the groundwater investigations as a separate study (this OU3), and address the buildings, soil and debris on the former CDE facility property as a single operable unit (OU2).

On September 30, 2004, EPA issued a ROD for OU2, with concurrence from NJDEP. The remedy included four key components:

- Relocation of the tenants at the Hamilton Industrial Park, demolition of the buildings and removal of the PCB-contaminated building debris for off-site disposal;

- Excavation, for off-site transportation and disposal, of the Capacitor Disposal Area (CDA), an area of debris located in the rear of the facility;

- Excavation of the principal threat material for on-site treatment using low-temperature thermal desorption (LTTD), or off-site disposal for material not amenable to LTTD treatment; and

- Capping of the property to prevent direct contact with or off-site migration of any residual contaminants that might remain, coupled with institutional controls to restrict the future use of the property and control any exposure to the facility soil.

Using Federal and State funds, EPA began relocation of the tenants in 2006, and completed the last relocation in the spring of 2007. The OU2 remedy has been performed in phases. The building demolition phase was performed first, allowing access to underlying contaminated soil that needed to be excavated. This work was completed in 2008. The CDA was addressed next, resulting in the removal of approximately 13,700 cubic yards of contaminated debris. The completion of the CDA excavation was followed by a third, and final, phase of the OU2 remedy, LTTD treatment and capping.

The OU2 remedial design identified approximately 69,000 cubic yards of soil requiring treatment using LTTD. A mobile LTTD treatment unit was erected on site and, after a startup period when the unit's air emissions control systems were tested to make sure they met performance criteria set by NJDEP, EPA began treating PCB-contaminated soil in November 2009, completing work in February 2011. Approximately 65,000 cubic yards of site soils were treated with LTTD. The minimum treatment target for the soils was 10 mg/Kg total-PCBs, but the unit actually treated the soils to a final concentration of less than 1 mg/Kg. The LTTD unit could not fully treat large debris and most of the capacitors found mixed in with the soil. Approximately 31,000 cubic yards of over-size debris and capacitors were screened out and sent off site for disposal as part of this phase of the cleanup.

The LTTD unit was fully decontaminated and removed from the former CDE facility in July 2011. The remedy also required installation of a multilayer cap (e.g., soil and asphalt), and a surface water collection system. These components of the remedy are now complete. The surface water collection system is installed above the cap so that surface water is collected and removed from the property without encountering residual soil contamination.

OU3 and OU4 Remedial Investigations

The comprehensive OU3 (groundwater) and OU4 (Bound Brook) RIs began concurrently in 2008. The OU3 field studies were completed in 2011, leading to this ROD. EPA expects to complete the OU4 field work, which includes the testing of over nine miles of the Bound Brook and its tributaries, connected floodplains, and extending into Green Brook, by the end of 2012. After completion of the sampling program, EPA will prepare an RI Report and perform human health and ecological risk assessments for OU4, followed by a FS study to evaluate potential remedies. These activities are planned for 2012 and 2013.

Enforcement Activities

EPA has identified a group of potentially responsible parties (PRPs) for the site. PRPs for the site include Cornell-Dubilier Electronics, Inc. (CDE), Dana Corporation (Dana), Federal Pacific Electric Company (FPEC), several government agencies that are alleged to have been involved with the company's operations during World War II, and DSC, the current owner of the former CDE facility property.

Five administrative orders have been issued to various PRPs for the performance of portions of removal actions required at the site. The first order, a Unilateral Administrative Order (UAO) issued to DSC in 1997, required the installation and maintenance of site stabilization measures to limit migration of contaminants from the industrial park. These actions included paving driveways and parking areas in the industrial park to minimize dust, installing a security fence, and implementing drainage controls to limit surface runoff.

In July 1998, EPA offered the PRPs an opportunity to perform a comprehensive RI/FS for the site, to help determine the nature and extent of contamination. After EPA and the PRPs were unable to agree on the scope of the RI required at the site, EPA elected to perform the RI/FS using federal funds.

In 1998 and 1999, EPA entered into two separate Administrative Orders on Consent (AOCs) with several site PRPs concerning the removal of PCB-contaminated soil from thirteen properties on Spicer Avenue, Delmore Avenue, and Hamilton Boulevard. DSC and CDE signed the 1998 AOC (addressing six properties), and Dana and CDE signed the 1999 AOC (addressing seven properties). EPA issued another UAO in 1999 to FPEC and DSC, requiring those parties to participate and cooperate in the soil removal at the seven properties covered by the 1999 AOC. In April 2000, EPA entered into an AOC with DSC requiring the removal of PCB-contaminated soil from one additional property on Spicer Avenue. DSC did not perform the work required under the AOC, so in 2004, EPA undertook the removal of PCB-contaminated soil from this property. In 2007, EPA and DSC entered into a past cost settlement in which DSC agreed to reimburse EPA’s cost of performing the removal work at the Spicer Avenue property.

In September 2003, after EPA issued a ROD for OU1, EPA and several of the PRPs entered into negotiations regarding the performance of the Remedial Design and Remedial Action (RD/RA) for OU1, under EPA oversight. EPA and the PRPs were unable to reach an agreement, and on August 24, 2004, EPA issued a UAO to DSC, CDE, and Dana, requiring them to perform the RD/RA for OU1. The PRPs informed EPA that they would not comply with the UAO, and EPA has been implementing the OU1 remedy using Federal and State funds.

After issuance of the OU2 ROD in September 2004, EPA offered the PRPs an opportunity to perform the OU2 remedy, and again the PRPs declined. EPA has performed the OU2 RD/RA with Federal and State funds.

In 2005, EPA and Dana signed an AOC in which Dana agreed to perform the OU3 RI/FS under EPA oversight; however, in 2006, Dana filed for bankruptcy, and was unable to continue to work under this AOC. EPA took over responsibility for performing the RI/FS at that time. EPA reached a bankruptcy settlement with Dana in 2008, resolving Dana's liability for an allowed claim in the bankruptcy proceeding.

The United States and CDE agreed to a proposed settlement to resolve the company's liability for the CDE site. The settlement, in the form of a proposed Consent Decree, was lodged in the federal district court for the District of New Jersey on August 28, 2012.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

EPA has worked closely with public officials and other interested members of the community since the site was first placed on the NPL. The Proposed Plan and supporting documentation for OU3 were released to the public for comment on July 20, 2012. The Proposed Plan and index for the Administrative Record were made available to the public online, and the entire Administrative Record file was made available at the EPA Administrative Record File Room, 290 Broadway, 18th Floor, New York, New York, and at the South Plainfield Public Library, 2484 Plainfield Avenue, South Plainfield, New Jersey.

On July 20, 2012, EPA published a notice in the *South Plainfield Observer* newspaper containing information concerning the public comment period for the site, including the duration of the comment period, the date of the public meeting and availability of the administrative record for the OU3 Proposed Plan. The public comment period began on July 20, 2012. Originally scheduled for 30 days, it was extended to 60 days at the request of a member of the public, ending on September 20, 2012. EPA published a press release on August 20, 2012, announcing the extension of the comment period, which was reported on by several newspapers.

A public meeting was held on August 7, 2012, at the South Plainfield Senior Center, 90 Maple Avenue, South Plainfield, New Jersey. The purpose of this meeting was to inform local officials and interested citizens about the Superfund process, to discuss the Proposed Plan and receive comments on the Proposed Plan, and to respond to questions from area residents and other interested parties. Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary, attached as Appendix IV to this ROD.

SCOPE AND ROLE OF THIS OPERABLE UNIT

For the purposes of planning response actions, EPA has addressed the site in separate operable units (OUs). Operable Unit 1 (OU1) addresses residential, commercial and municipal properties with elevated PCB levels in surface soils or interior dust in the vicinity of the former CDE facility. OU2 addresses buildings and soil at the former CDE facility, and included relocation of tenants from the facility followed by demolition of the buildings, excavation and on-site treatment or off-site disposal of PCB-contaminated soil and debris, and capping of the 26-acre facility. The OU1 and OU2 remedies are currently being performed by EPA using Federal and State funding. This action, OU3, is for groundwater and will comprise the final action for the groundwater, excepting an area of the groundwater that has the potential to discharge to Bound Brook, as discussed in the selected remedy. The OU4 remedy will address sediments and surface water in the Bound Brook, and the groundwater recharge area, and is expected to be the final response action for the site.

OU2 addressed “principal threat” wastes in soils, including wastes that were considered ongoing source materials of groundwater contamination. EPA generally does not consider groundwater as principal threat waste, although non-aqueous phase liquids (NAPLs) may be viewed as source materials. At this site, EPA has not designated the groundwater a principal threat waste.

SUMMARY OF SITE CHARACTERISTICS

The discussion below summarizes a few essential features of the highly complex geologic setting found at the site. A better understanding of the site conditions can be found in the RI/FS Reports. To understand the site groundwater, EPA installed 22 monitoring wells in the Passaic Formation bedrock that is the predominant geologic unit within the study area. Wells were drilled as deep as 600 feet below ground surface (bgs). In addition to sampling groundwater for hazardous substances, EPA performed a series of pumping studies and other standard aquifer tests to better understand how fractures in the bedrock aquifer are connected, with the goal of understanding how the groundwater moves. The RI also included rock coring and other sampling techniques to analyze the extent to which contaminants had been diffused into the rock itself, a phenomenon called matrix diffusion that is associated with certain rock formations, including the Passaic Formation.

Geology and Hydrogeology

The study area shown on Figure 2 is relatively flat, with surface water (Bound Brook, Cedar Brook and Spring Lake) as primary topographic features. The shallowest subsurface deposits are unconsolidated (loose material - not solid rock), consisting primarily of red-brown silt, sand and clay layers intermixed with urban fill. These deposits are no thicker than 15 feet at the CDE facility but are found as thick as 30 feet in the study area.

Below the overburden is the Passaic Formation, part of an ancient basin of Triassic-Jurassic sedimentary and igneous rocks found across the region. Tests during the RI indicate sedimentary rock (mudstone, siltstone and shale) typical of the Upper Passaic Formation, with numerous fracture zones present in bedrock from its surface to approximately 600 feet bgs, the maximum drilled depth.

The Passaic Formation generally forms a highly interconnected multi-aquifer system that is several hundred feet thick. Groundwater movement is primarily through horizontal and vertical fractures. In some areas, surface water (precipitation or local surface water features) either recharges, or is recharged by, the bedrock groundwater. Groundwater in fractured sedimentary rock occurs in the pore spaces or “matrix” of the rock and in fractures of the rock; the capacity of a rock to store water is referred to as its “porosity.” In the case of sedimentary rock, the porosity of the rock matrix is relatively high (commonly 5 to 20 percent of the rock’s volume); therefore, a large volume of water can be stored in the pore spaces of the bedrock. Conversely, the porosity of the rock fractures is relatively low, typically between 0.1 and 0.001 percent of the rock’s volume; therefore, a much smaller amount of water can be stored in the fractures. The average fracture aperture size found at the site is 83 microns, or slightly smaller than the thickness of a human hair. The differences in porosity only refer to the total amount of water stored in the rock matrix (pore spaces) and fractures.

Porosity does not correlate to movement of water through the rock matrix or fractures. The “permeability” or “effective porosity” of a rock formation refers to the degree of interconnectedness of the pore spaces and fractures in a rock, which in turn affects the degree to which groundwater can move through the rock. For the Passaic Formation, the interconnectivity of the pore spaces of the rock matrix is very low, so while a large volume of water is stored in the pore spaces, the permeability of the rock matrix is very low. By contrast, the degree of interconnectedness of the fracture network is high, and this fracture network is considered highly permeable.

Overall, the bedrock matrix has a high porosity (ability to store water) but a low permeability (ability to transmit the stored water). Conversely, the bedrock fractures have a low porosity (ability to store water) but a high permeability (ability to transmit water). This is a general description of most of the encountered bedrock. The shallow bedrock has a high matrix porosity with a high capacity to store water. Also, one pronounced large fracture zone was encountered at approximately 65 feet bgs at the CDE site, and again at close to 300 feet bgs near Spring Lake (geologic features are often tilted like this so that the same unit encountered at one depth in one location will appear at another depth at a different location). This intensively fractured zone is characterized by significantly larger-than-average fractures, but it is the exception.

Keeping in mind that the portion of the aquifer studied at the site is hydrogeologically interconnected, for ease of discussion the aquifer is described as three layers: shallow, intermediate, and deep water bearing zones as depicted in Figures 3, 4 and 5. The potentiometric surfaces depicted on these figures indicate the direction of groundwater flow at each of these depths. The shallow water bearing zone extends from ground surface to a depth of approximately 120 feet bgs and is hydraulically connected to Bound Brook, Cedar Brook and Spring Lake. This surface water influence disappears with depth. Groundwater movement in both the intermediate and deep water bearing zones is primarily to the northwest at the former CDE facility and arcs to the north and northeast with increased proximity to the Park Avenue wellfield (discussed below).

Public Water Supply Wells Pumping History

Units of the Passaic Formation are used as a source of potable water for communities in the study area (Figure 6). Numerous wells tap the formation, with reported pumping rates ranging up to several hundred gallons per minute. Current groundwater pumping influences regional and local groundwater flow direction, and historical pumping of public water supply wells has exerted a dominant influence on groundwater movement at the former CDE facility.

All the currently-operating public water supply wells in the area are owned and operated by Middlesex Water Company (MWC). MWC has been instrumental in enabling EPA and its consultants to reconstruct a pumping history, by researching its archives and producing records that extend back to the 1950s. The most influential wellfields (shown on Figure 6) affecting site groundwater are (currently) the Park Avenue wellfield and (formerly) the Spring Lake wellfield.

The Spring Lake wellfield is not currently used. It is made up of wells that surround Spring Lake, and began operation in the 1960s. Use of the system decreased in the 1990s, and the last of the wells stopped pumping in 2003. MWC's decision to curtail and then discontinue use of the Spring Lake wellfield was partly a result of high VOC levels in the wells. (Water from the Spring Lake wells was combined and centrally treated at Spring Lake before customer use.) While the Spring Lake treatment works could easily remove TCE and other VOCs, MWC elected to use other parts of its pumping network instead. Though dormant, the Spring Lake wellfield infrastructure is still maintained by MWC and could be used at some time in the future.

When operating, the Spring Lake wellfield influenced the direction of groundwater movement at the site. A comparison of historical aquifer data measured in 2000 to recent data show a change in groundwater elevations and the direction of groundwater movement. The groundwater elevations measured in 2000 were approximately five feet lower than those observed in the recent data. Past groundwater elevations indicated that groundwater movement in the shallow water bearing zone was generally drawn to the northwest by Spring Lake pumping, with surface water from Bound Brook discharging to the groundwater. Current discharge conditions are just the opposite - today, shallow groundwater is discharging to Bound Brook.

Since the cessation of pumping at Spring Lake, hydrogeologic conditions at the former CDE facility are influenced by the on-going groundwater withdrawals at the more distant Park Avenue wellfield. Today, Park Avenue pumps at a rate of several million gallons per day, making it the dominant pumping center in the area.

NATURE AND EXTENT OF CONTAMINATION

Soils from OU2 and dense non-aqueous phase liquids

The primary contaminants of concern identified in site soils were TCE and PCBs. (The RI documents the full extent of contaminants detected at the site.) These chemicals were released at the site in large quantities, as evidenced by the extent of the OU2 remedy, which required the excavation and treatment of principal threat wastes down to the top of the bedrock surface (a maximum of approximately 15 feet bgs).

There is strong evidence that TCE and PCBs were released as dense non-aqueous phase liquids (DNAPLs). DNAPLs are among the most persistent contaminants in groundwater. When released into the environment, a DNAPL will flow downward through unsaturated soils and, after encountering groundwater, will also flow downward through groundwater-saturated porous media (i.e., rock formations), because DNAPLs are denser than water. DNAPLs generally have low water solubility, which, along with other factors, affects the flow properties of the fluid and can lead to pooling. Upon reaching the top of fractured sedimentary rock, the DNAPL will pool in areas of low permeability, eventually migrating downward through transmissive fracture zones. DNAPL typically penetrates the fracture network in the rock formation, working into ever smaller openings, thus creating pools, fingers and disconnected droplets of residual contamination.

Most of the focus of OU3 has been on several VOCs, particularly TCE, that can dissolve in water and be carried far from the original point of release. While site contaminants were released as DNAPLs, there is little evidence of DNAPL remaining at the former CDE facility. The only detections were near monitoring wells MW-14S and 14D. Depending upon the water solubility of a given chemical, DNAPLs such as VOCs can begin to dissolve into groundwater and move with the groundwater. Due to their low solubility, PCBs generally do not, to any significant degree, spread in a dissolved phase. However, chlorinated solvents such as TCE can enhance the solubility of PCBs and enhance their aqueous mobility in groundwater. Thus, while the extent of VOC contamination is wide-spread, the extent of PCBs in groundwater from the former CDE facility is much more limited in areal extent. Even though PCBs were mainly detected at the former CDE facility, some very low concentrations of PCBs were detected off site but at concentrations sufficiently low so as to not pose a risk to the health and welfare of the public.

The absence of DNAPL is only partly explained by solubility. Over time, most of the DNAPL has been diffused into the rock itself, through matrix diffusion.

Rock Matrix Diffusion

The highly interconnected fracture network in the Passaic Formation in the study area provides a relatively large surface area for VOCs to sorb onto and then diffuse, or move, into the pore spaces in the rock itself, a process known as matrix diffusion. The pore volume of the rock matrix at the site is approximately four orders of magnitude larger than the fracture network, allowing it to hold the majority of the contaminant mass. Once the VOCs diffuse into the rock, they are left nearly immobile because of the low hydraulic conductivity of the rock matrix.

In the early stages after a release, diffusion into the matrix can slow the advance of the dissolved plume through the fractures. At first, the diffused mass penetrates only a short distance into the bedrock, but in cases with very large initial DNAPL releases (as at the CDE site), matrix diffusion can drive high VOC concentrations until it fully penetrates the matrix block. This effect more commonly occurs in source areas, where aqueous mass concentrations are highest and the residence time is the longest.

After a significant period of time (e.g., 50 years) in the fractured bedrock environment, contaminant mass that has moved into the rock matrix will be higher in concentration than the groundwater within the adjacent fractures. At this point, the process of matrix diffusion will reverse (this is known as back diffusion), slowly releasing the mass in the rock matrix pore water back to the fractures. Back diffusion occurs slowly over a very long period of time (usually a multi-century timeframe). So while contaminant movement through a bedrock aquifer can be retarded or slowed down by diffusion into the rock matrix, this same process is a major limiting factor in effective remediation due to the even slower back diffusion process.

As part of the RI, 465 split rock core samples were collected to characterize rock matrix diffusion at the CDE site. Samples were collected at the highest source areas at the former facility (monitoring wells MW-14S and 14D), just off the facility (MW-16), and near Spring Lake (MW-20).

TCE was the most common VOC present in the rock matrix samples (345 detections among 465 samples), followed by cis-1,2-dichloroethylene (cDCE; 96 detections), and tetrachloroethylene (PCE; 27 detections). The chemical cDCE is a breakdown product of TCE, and PCE is another common industrial solvent, though not one associated with the CDE site. At the MW-14 location, the distribution of the results between 23 and 67 feet bgs indicates that contaminant mass has completely penetrated the matrix blocks between fractures, indicative of very high historic aqueous concentrations, a dense fracture network, and sufficient time to completely diffuse into the matrix. The pore water concentration of TCE in the rock matrix ranged from non-detect to 120,000 micrograms per liter (µg/L), with the highest concentration detected at 33.1 feet bgs. The concentration of cDCE in the rock matrix ranged from non-detect to 330,000 µg/L, with the highest concentration also detected at 33.1 feet bgs. PCE in the rock matrix ranged from non-detect to 130 µg/L, with the highest concentration detected at 75.95 feet bgs.

The results at MW-16 and MW-20 indicate that VOC mass was detected throughout the entire cored interval at each location (to a depth of 250 feet bgs for MW-16 and 412 feet bgs for MW-20). The largest proportion of VOC mass was detected in the 50 to 150 feet bgs depth interval for MW-16, and from approximately 220 to 350 feet bgs for MW-20, with the contaminant mass fully penetrating the matrix blocks between fractures in these intervals. In shallower and deeper sections of these borings, matrix diffusion was less pronounced, but still present. Pore water concentrations were substantially higher in MW-16 than in MW-20. For example, the maximum detected TCE concentration in MW-16 was 7,800 µg/L at 46.7 feet bgs, whereas in MW-20, it was 1,100 µg/L at 295.6 feet bgs.

Groundwater Shallow Groundwater (to 120 feet bgs): The highest VOC concentrations were detected in the bedrock beneath the overburden source area at MW-14S/D, near the center of the former CDE facility, at depths between 23 and 75 feet bgs, with concentrations falling off sharply at depths greater than 75 feet bgs. Figure 3 shows the areal distribution of TCE in the shallow groundwater (TCE, as the most wide-spread site contaminant, is the best representation of the maximum extent of site constituents). The resultant VOC mass in the shallow bedrock has moved to the northwest, consistent with the observed shallow groundwater gradient and the historic gradient. Contamination in the shallow water bearing zone is generally limited to the area south of Bound Brook, as the surface water body currently acts as a boundary to shallow groundwater movement; however, elevated concentrations of VOCs in the shallow water bearing zone were detected north of Bound Brook in ERT-4, MW-20, and MW-21. The elevated results at these locations suggest vertical mass transport along steeply dipping fractures, and possibly the influence of historic pumping from the now inactive Spring Lake wellfield.

Intermediate Groundwater (120 to 160 feet bgs): Figure 4 shows the areal distribution of TCE in the intermediate groundwater. The groundwater data show a more northwesterly distribution of contaminants near the former CDE facility, with a northeastward-arching path of travel towards the capture zone of the currently operating Park Avenue wellfield to the north.

Deep Groundwater (200 to 240 feet bgs): Figure 5 shows the areal distribution of TCE in the deep groundwater. As with the distribution of aqueous mass described in the intermediate water bearing zone, the groundwater data show a more northwesterly distribution of contaminants near the former CDE facility, with a northeastward arching path of travel towards the capture zone of the currently operating Park Avenue wellfield.

Figure 7 shows a cross-section of VOC concentrations, indicating the downward direction of contaminant migration, generally aligned with the drawdown from municipal pumping wells.

As previously mentioned, a highly transmissive fracture zone was intersected by several boreholes during the investigation. This fracture zone probably facilitated the down-gradient transport of aqueous mass along this preferential pathway.

The aqueous mass movement has also been influenced by ongoing public water supply well withdrawals. Although the general direction of groundwater movement beneath the former CDE facility is to the northwest, the pumping centers to the north and east of the former CDE facility have redirected the groundwater movement and contaminant mass transport. Today, groundwater extraction at the Park Avenue wellfield is the dominant hydraulic influence on the local hydrogeology.

Other Potential Sources and Effects on Public Water Supply Influent

While the site is a significant source of VOCs to groundwater in South Plainfield, NJDEP has identified other sources with similar contaminants near the study area. EPA’s furthest well from the site, MW-23, is approximately 4,000 feet down-gradient of the facility and still contains elevated levels of site-related constituents (e.g., 70 μg/L TCE was detected at approximately 450 feet bgs). The RI concluded that additional monitoring locations are needed further from the former CDE facility, expanding the well network to the north and northeast; however, the RI also acknowledges that additional wells to the northeast, the direction of groundwater flow, will be strongly influenced by the local wellfields, and while VOCs detected in monitoring wells close to these pumping centers might originate from the CDE site, it is also possible that they originate from multiple sources as plumes comingle nearer the pumping centers.

Based on data provided by MWC, the influent water entering the MWC treatment works generally has TCE levels in the range of non-detectable to 2 μg/L (the New Jersey drinking water criteria is 1 μg/L). Levels in the treated water are non-detectable. Given the large capture zone of MWC's multiple wellfields, it cannot be determined whether and to what extent contamination from the CDE site is contributing to detectable levels of TCE in the influent water.

Private Well Investigations

Numerous private, industrial, and municipal wells tap the Passaic Formation near the site study area and, as part of the RI, EPA searched for wells in the area that may be in use. Through NJDEP's well registry database and other resources, to date, EPA has identified 40 potential wells predominantly downgradient and within a one-mile radius of the site (31 residential wells and nine wells designated for industrial/municipal - non-drinking - purposes), and has visited each identifiable location. Most of the locations from NJDEP's registry were older private wells (e.g., installed before the 1960s) and EPA was able to determine that these wells no longer exist. EPA identified one private drinking water well, belonging to a home upgradient of the site. Though it is not within the area of site groundwater contamination, EPA still sampled this well and found no detectable contamination.

EPA also identified four wells used by the Borough of South Plainfield and the South Plainfield School District for a variety of purposes, from irrigation to filling the municipal swimming pool. EPA sampled these wells, detecting VOCs in excess of drinking water standards. Because these wells were being used for purposes other than drinking water (such as irrigation), EPA evaluated whether people using the facilities where the water was used and/or workers operating the wells and associated equipment are being exposed to unacceptable levels of contaminants. EPA did not identify unacceptable exposures from the use of these wells, as long as the water is not used for drinking water. At the request of the Borough of South Plainfield, EPA tested the pool water in the municipal swimming pool. The tests, collected just after the pool was filled, did not detect any TCE. These results were as EPA had expected: TCE, like other VOCs, poses a health threat through consumption (in drinking water) or vapor exposure (collecting in an enclosed space like a basement), but quickly evaporates from surface water, alleviating the potential for exposure.

Bound Brook Sediments and Groundwater
The investigation of Bound Brook sediments is not yet complete and is not the subject of this ROD. Understanding potential threats from contaminated groundwater to surface water is a component of the OU4 study. While the OU2 remedy is eliminating the potential for surface transport of contaminants to Bound Brook, the OU3 RI shows strong evidence that shallow groundwater is discharging to Bound Brook, and shallow wells adjacent to the Brook suggest the potential for contaminant discharge to the Brook.

TCE that might discharge to surface water would evaporate quickly, and the potential for exposure is minimal. Similarly, the relative insolubility of PCBs would limit the concentration of PCBs in groundwater discharging to surface water. In July 2012, as part of the OU4 Bound Brook investigation, seep samplers were deployed along the banks of the Brook to measure groundwater contamination discharging to surface water, if any, from which the potential for human or ecological exposure can be evaluated. The seep sampling will clarify whether this is a plausible transport mechanism.

Vapor Intrusion
VOC vapors have the potential to volatilize from contaminated groundwater and collect inside closed spaces (e.g., basements), and this “vapor intrusion” poses potential health concerns. Vapor intrusion studies were conducted by EPA at a number of properties in South Plainfield. EPA targeted residential properties between the former CDE facility and Spring Lake, where shallow groundwater contamination posed a plausible concern for vapor intrusion occurring (areas with only deeper groundwater contamination are not at risk). EPA also targeted a number of properties in the core OU1 study area, just south of the former CDE facility, as a precaution. These studies indicated that vapor intrusion exposure is not a current pathway of concern at the site. EPA tested 25 properties, and all but two showed no evidence of vapors in the subsurface. Although

elevated vapor levels were detected under the basement slab at two properties, one was in an area not affected by site groundwater contamination, and at the other, only PCE was detected, indicating the possible contamination is not site-related. A local source of PCE appears to be affecting this property, as the PCE does not originate from the site. In both cases, there was no evidence of vapors inside the structures. These locations have been referred to NJDEP for further evaluation.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Groundwater Uses: Groundwater underlying the site is considered by New Jersey to be Class IIA, a source of potable water; however, residents and businesses in the area of the site are currently using publicly supplied water, which is treated to assure all drinking water standards are met for VOCs or other contaminants. If VOC-contaminated groundwater from the site is used as drinking water in the future without treatment, risks to human health would exceed Federal and State acceptable levels.

Land Use: The groundwater study area encompasses a large section of South Plainfield, including residential, commercial/industrial and municipal zoning. EPA's selection of a remedy for OU3 is not anticipated to affect or impair these land uses.

With regard to former CDE facility property, in 2000, the Borough of South Plainfield began assessing potential future redevelopment plans for this property and considering how that redevelopment might be accomplished in conjunction with the OU2 remedy for the facility soils and buildings. In December 2001, the South Plainfield Borough Council designated the Hamilton Industrial Park (the former CDE facility) and certain lands in the vicinity a "Redevelopment Area," and in July 2002, the Borough adopted a redevelopment plan. The Borough subsequently designated a developer for the site. With the OU2 cleanup nearing completion, EPA has been working with the developer to resolve the many engineering and legal issues associated with putting the former CDE facility property back into productive use.

SUMMARY OF RISKS ATTRIBUTABLE TO GROUNDWATER

Based upon the results of the groundwater RI, a Baseline Human Health Risk Assessment (BHHRA) was conducted to estimate current and future effects of contaminants on human health and the environment. A BHHRA is an analysis of the potential adverse human health effects caused by hazardous-substance exposure in the absence of any actions to control or mitigate these exposures under current and future site uses. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline risk assessment for this site. Tables 1 through 6 recap the relevant subset of information from the BHHRA (i.e. exposure pathways and chemicals found to pose unacceptable risk to human health).

A screening-level ecological risk assessment was previously conducted during the OU2 RI to assess the risk posed to ecological receptors due to site-related contamination. A Baseline Ecological Risk Assessment will be prepared as part of the OU4 RI, addressing the Bound Brook.

Human Health Risk Assessment
A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios, as follows.

Hazard Identification – uses the analytical data collected to identify the contaminants of potential concern (COPCs) at the site for each medium, with consideration of a number of factors explained below.

Exposure Assessment – estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (*e.g.*, ingesting contaminated groundwater) by which humans are potentially exposed.

Toxicity Assessment- determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of effect (response).

Risk Characterization – summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The risk characterization also identifies contamination with concentrations that exceed acceptable levels, defined by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) as an excess lifetime cancer risk greater than 1×10^{-6} - 1×10^{-4} or a Hazard Index greater than 1.0; contaminants at these concentrations are considered contaminants of concern (COCs) and are typically those that will require remediation at the site. Also included in this section is a discussion of the uncertainties associated with these risks.

Hazard Identification: In this step, analytical data collected during the RI was used to identify COPCs in the groundwater at the site based on factors such as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations of the contaminants as well as their mobility, and persistence. VOCs and PCBs, among other chemicals, were determined to be COPCs in site groundwater. PCBs, TCE, cDCE, and other VOCs were identified as risk driving chemicals (*i.e.*, COCs) for site groundwater; a summary of the concentrations of these chemicals are shown in Table 1. A comprehensive list of all site COPCs can be found in the Table 2 series of the June 2012 Groundwater BHHRA report.

Exposure Assessment: In this step, the different exposure scenarios and pathways through which people might be exposed to the contaminants identified in the previous step were evaluated.

Consistent with Superfund policy and guidance, the BHHRA is a baseline human health risk assessment and therefore assumes no remediation or institutional controls to mitigate or remove hazardous substance releases. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the site. The RME is defined as the highest exposure that is reasonably expected to occur at a site. For those contaminants for which the risk or hazard exceeded the acceptable levels, the central tendency estimate (CTE), or the average exposure, was also evaluated.

The exposure assessment identified potential human receptors based on a review of current and reasonably foreseeable future land use at the site. The CDE site lies within a section of the Borough of South Plainfield that can be characterized as an urban area. Land uses surrounding the former CDE facility are primarily commercial/light industrial to the northeast and east, residential to the south and north, and mixed residential/commercial to the west. The former CDE facility is currently zoned for commercial/industrial use. Based on the NJDEP classification of groundwater below the site as Class IIA groundwater (i.e., includes potable usage), a future potable use of groundwater was evaluated.

Based on information gathered during the RI such as zoning and demographic information, three exposure scenarios for the site were selected: 1) current and reasonably anticipated future exposure to tap water and/or process water for commercial/industrial uses at the former facility property; 2) current and future exposure to shallow groundwater for construction or utility workers; and 3) future potable groundwater use by both adult and child residents living within the boundaries of the site groundwater plume.

Potential exposure routes for the site varied by receptors and included ingestion and dermal contact with constituents in groundwater, inhalation of vapors emanating from the tap during showering and bathing, as well as inhalation of constituents volatilizing to ambient or indoor air from groundwater. Table 2 presents all exposure pathways considered in the Groundwater BHHA, and the rationale for the selection or exclusion of each pathway.

Toxicity Assessment: In this step, the types of adverse health effects associated with contaminant exposures and the relationship between magnitude of exposure and severity of adverse health effects were determined. Potential health effects are contaminant-specific and may include the risk of developing cancer over a lifetime or other noncancer health effects, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some contaminants are capable of causing both cancer and noncancer health effects.

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards due to exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the site-related chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and non-carcinogens, respectively.

Toxicity data for the human health risk assessment were provided by the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or another source that is identified as an appropriate reference for toxicity values consistent with EPA's directive on toxicity values. Toxicity information for the risk driving chemicals of concern is presented in Table 3 (noncancer toxicity summary) and

Table 4 (cancer toxicity summary). Additional toxicity information for all COPCs is presented in the Table 5 and 6 series of the June 2012 Groundwater BHHRA.

Risk Characterization: This step summarized and combined outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures were evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

Risk = LADD x SF

Where: Risk = a unitless probability (1×10^{-6}) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

The likelihood of an individual developing cancer is expressed as a probability that is usually expressed in scientific notation (such as 1×10^{-4}). For example, a 10^{-4} cancer risk means a “one-in-ten-thousand excess cancer risk”; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with 10^{-6} being the point of departure.

For noncancer health effects, a hazard index (HI) is calculated. The HI is determined based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

Where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (*i.e.*, chronic, subchronic, or acute).

The key concept for a noncancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which noncancer health effects are not expected to occur.

The HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1.0 indicates that the potential exists for non-carcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1.0, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1.0 to evaluate the potential for noncancer health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

As summarized in Tables 5 and 6, results of the BHHRA indicate the cancer risk for a commercial/industrial worker exposed to groundwater is 3×10^{-3}, and the cancer risk for adult and child residents exposed to site groundwater is 7×10^{-3} and 3×10^{-3}, respectively. The risk-driving chemical in these exposure scenarios is TCE, with other VOCs, PCBs and arsenic as minor contributors in groundwater. These risk estimates exceed EPA's acceptable risk range for cancer.

The quantitative assessment also indicated that groundwater contamination poses unacceptable noncancer health hazards due to PCBs and cDCE for all future use scenarios as well (construction worker, commercial/industrial worker, resident). PCBs were the main risk-driving contaminant in groundwater in the area around the former CDE facility. In off-site areas, cDCE was the primary noncancer risk-driver, while PCBs were not found away from the facility. Noncancer Hazard Indices ranged from 3 for the construction/utility worker exposure to shallow off-site groundwater to 700 for resident child exposure to the entire aquifer. Risk and hazard estimates for the remaining receptors were less than or fell within the acceptable risk range of EPA's target values.

Summary of Ecological Risks

A screening of ecological risks was conducted during the OU2 soil remedial investigation and concluded that property conditions did not necessitate a quantitative ecological risk assessment. No ecological evaluation of groundwater was deemed necessary.

A plausible ecological exposure scenario may derive from groundwater discharge to the Bound Brook, and EPA is assessing ecological risks to the Bound Brook as part of OU4.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- exposure assessment estimation
- toxicity evaluation
- risk characterization
- toxicological data

Uncertainty in environmental sampling arises, in part, from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is uncertainty as to the actual levels present. Environmental chemistry-analysis errors can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the site, and is highly unlikely to underestimate actual risks related to the site.

More specific information concerning public health and environmental risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the Groundwater BHHRA, which is in the Administrative Record for the site.

Conclusion
The response action selected in the ROD is necessary to protect public health or the environment from actual or threatened releases of hazardous substances from the site into the environment.

REMEDIAL ACTION OBJECTIVES

The area of the Passaic Formation affected by the site has been identified by New Jersey as Class IIA (a source of drinking water); therefore, applicable or relevant and appropriate requirements (ARARs) for groundwater include the New Jersey Remediation Standards for Groundwater (NJAC 7:26D), the Safe Drinking Water Act maximum contaminant levels (MCLs), and the New Jersey Secondary Drinking Water Standards (NJAC 7:10-7). In developing remedial action objectives (RAOs) for groundwater, EPA expects to return usable groundwater to its beneficial use wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site.

EPA also acknowledges that groundwater restoration, in this case to drinking water standards, is not always achievable, due to limitations in remedial technologies and other site-specific factors. While evaluating potential remedial technologies for the FS, EPA also evaluated the technical feasibility of aquifer restoration and the need to waive ARARs for technical impracticability (TI).

Potential for Groundwater Restoration

A stand-alone report, "Technical Impracticability Evaluation, Operable Unit 3: Groundwater" (June 2012) (TI Evaluation Report), was prepared to assess whether it is technically practicable, from an engineering perspective, to restore groundwater at the site within a reasonable timeframe. Within the TI Evaluation Report, factors such as the volume and duration of the release of site-related constituents were considered in evaluating the potential for groundwater restoration at the site. The chemical properties of these constituents, and the volume and depth of contaminated media were also considered. In addition, site-specific hydrogeologic characteristics were assessed as they relate to groundwater restoration potential. Finally, factors related to the developed urban/suburban setting were also included in this assessment. These factors are summarized below.

Site-specific Factors

Groundwater flow in the Passaic Formation occurs primarily through a fracture network that is highly conductive and interconnected. These interconnected fractures resulted in rapid horizontal and vertical movement of groundwater and, with it, contaminant mass. Because the fracture network is so pervasive, it has provided a relatively large surface area for the VOCs to sorb onto and then diffuse into the rock matrix. The pore volume of the rock matrix is nearly two orders of magnitude larger than the fracture network porosity, allowing it to hold the majority of the contaminant mass, as confirmed by site-specific rock matrix sampling.

Ongoing pumping from public water supply wells appears to have expanded the size and direction of the contaminant plume over time. In areas where the concentration of VOC contaminants in fractures is greater than that in the adjacent matrix pore water, diffusion into the rock occurs. This diffusion retards the further expansion of the leading edge of the aqueous mass. Thus, the process of plume expansion may have taken place rapidly during the period of ongoing discharges (when CDE was operating and VOC concentrations were at their highest, resulting in a significant concentration gradient), and has slowed as the contaminant plume was drawn further out into the rock formation. Today, conditions are reversed in portions of the aquifer: back diffusion out of the rock matrix (pore water) is now occurring in areas where concentrations in the rock matrix are substantially elevated relative to the nearby fractures. Back diffusion from pore water to the fractures will perpetuate ongoing groundwater contamination over a very long period of time (on the order of multiple centuries).

Technology Limitations and Site-location Factors
Because the VOC contamination is now largely trapped within the rock matrix, to be successful, a remedial technology needs to be capable of treating contamination in both the rock matrix and the bedrock fractures. Furthermore, an effective technology must remain within the rock matrix over a period of time long enough to promote treatment. A review of currently available remedial technologies identified no technologies capable of effectively treating the fractured bedrock in full-scale implementation. Reviewed technologies included widely used methods (*e.g.*, groundwater extraction and *ex-situ* treatment, *in-situ* bioremediation, *in-situ* chemical treatment), and innovative technologies (*e.g.*, aquifer heating).

Only aquifer heating showed the potential to influence contaminant concentrations within the pore water; but here the limiting factor becomes the highly developed nature of South Plainfield. Thermal remedial technology would have to be applied over a large area occupied by residences, businesses, and municipal facilities where bedrock matrix contamination contributes to ongoing exceedances of ARARs. Implementation of any of *in-situ* remediation technology over such an area is not practicable. (Extraction/*ex-situ* treatment and aquifer heating were evaluated on a relatively small scale in the FS, as discussed in further detail below.)

Stability of Groundwater Conditions
As discussed above, matrix diffusion causes the leading edge of aqueous mass to be strongly attenuated relative to the mean groundwater velocity in the fracture network. Once diffused into the rock, it is left nearly immobile because of the low hydraulic conductivity of the rock matrix. This is due to the combined effects of diffusion-driven mass transfer from the fractures into the rock matrix, contaminant sorption and degradation, and hydrodynamic dispersion. Based upon EPA's experience at other sites and site-specific data, EPA expects that little, if any, additional aqueous VOC plume migration is anticipated to occur.

Based upon the findings of the potential for aquifer restoration, EPA concluded that a waiver of the groundwater ARARs will be required due to technical impracticability. The TI

Evaluation Report documents EPA's findings and identifies a zone where ARARs are expected to be exceeded for the foreseeable future. (For further details, please refer to Figure 7-1 from the TI Evaluation Report, in the Administrative Record.)

When restoration of groundwater to beneficial uses is not practicable, EPA selects an alternative remedial strategy that is technically practicable, protective of human health and the environment, and satisfies statutory and regulatory requirements of CERCLA. Consistent with the NCP, alternative remedial strategies for TI sites typically address three site issues: "exposure control;" "source control;" and "aqueous plume remediation." RAOs have been developed for each component of EPA's recommended alternative remedial strategy.

Remedial Action Objective for "Exposure Control"
The primary objective of any remedial strategy is overall protectiveness, in this case by mitigating exposure to contaminated groundwater for potential receptors:

- Prevent or minimize potential risks to human receptors from exposure by contact, ingestion, or inhalation/vapor intrusion of contaminants in groundwater attributable to the site.[2]

Remedial Action Objectives for "Source Control"
For "source control," when restoration of groundwater to beneficial uses is not practicable and a TI waiver is necessary, EPA expects to address contaminant source areas to the extent practicable, particularly when addressing groundwater sources also supports further risk reduction for the site as a whole. By implementing a remedial action for the former CDE facility, which addresses VOCs and PCBs in the overburden soil, EPA has already addressed site sources to the extent practicable, and the OU2 remedy also supports further risk reduction at the site overall. Thus, the OU3 FS evaluated whether further "source control" actions could be taken in the bedrock aquifer.

For the bedrock groundwater, the extensive zone over which VOCs have adsorbed to and/or diffused into the bedrock matrix (approximately 825 acres) constitutes what is expected to be an ongoing source of contamination to the groundwater, via back diffusion to the groundwater in the fractures, for centuries.

[2] In the Proposed Plan, this RAO also identified ecological receptors. EPA will evaluate potential risks to ecological receptors in the OU4 RI/FS.

As discussed in the TI Evaluation Report, there are no remedial prospects for achieving ARARs for the whole of the affected aquifer within a reasonable timeframe. The primary processes whereby the contaminants will naturally attenuate (dilution, dispersion and natural degradation) are occurring in portions of the aquifer, but at very slow rates, and there are no currently available technologies effective at remediating the majority of the mass within in the rock matrix pore water.

While restoration of the entire aquifer is not practicable, the OU3 FS evaluated whether treatment and/or containment of higher concentration areas in groundwater and in the rock matrix pore water might further satisfy EPA's expectation to address source areas. For example, the FS evaluated whether reducing the mass remaining in the ground might allow at least part of the aquifer to restore more quickly. The RAOs used to assess these "source control" alternatives are as follows:

- Mitigate, to the extent practicable, a "contaminant source area" as an ongoing source of groundwater contamination to areas beyond it;
- Demonstrate the potential (through predictive aquifer modeling) that mass reduction or containment of the targeted "contaminant source area" would provide long-term improvement to the groundwater in a reasonable time frame; and
- Support further risk reduction for the site as a whole.

To satisfy these RAOs, the FS evaluated two different "contaminant source areas" of different contaminant concentrations at the area of the original release, the former CDE facility: 1) a zone in which concentrations of total VOCs exceed 25,000 µg/L; and 2) a zone in which concentrations of total VOCs exceed 2,500 µg/L. The 25,000 µg/L contour encompasses most of the area where VOC mass has fully penetrated the rock matrix. The 2,500 µg/L total VOC area was selected as a second point of comparison, to allow for the evaluation of a response action approximately one order of magnitude larger in areal extent than the 25,000 µg/L total VOC area. (A more comprehensive discussion of the rationale for selecting these zones is included in the FS.)

Remedial Action Objective for "Aqueous Plume Remediation"
Wide-spread rock matrix diffusion is the primary site factor that renders plume restoration technically impracticable from an engineering perspective, with the VOCs in the rock matrix pore water acting as a continuing source to neighboring rock fractures

for the foreseeable future. In such cases, EPA considers hydraulic containment of the leading edge of the aqueous plume, assuring that the plume size does not increase and, in combination with either active aquifer restoration (pumping wells) or natural processes (diffusion, dispersion and natural degradation), allowing portions of the aquifer outside the TI zone to recover and eventually meet ARARs.

Groundwater modeling conducted as part of the RI demonstrated that, given that the original DNAPL releases occurred at least 50 and as long as 80 years ago, the VOC plume has, over that period of time, reached a point where it is no longer expanding, and the leading edge of the plume is not currently expanding. Groundwater flow direction is controlled by municipal well pumping. The rate and extent of pumping has varied over time, but within a relatively narrow range, generating a relatively stable flow field.

While the plume may not currently be expanding, the following RAO has been developed to satisfy EPA's expectations with respect to the prevention of further plume expansion and, to the extent practicable, restoration of the aqueous plume:

- Prevent further migration of site contaminants in groundwater at levels posing an unacceptable risk to human health beyond the areal extent of the proposed TI zone.

As previously mentioned, groundwater modeling indicates that the leading edge of the plume is not currently expanding. However, EPA will continue to monitor area wells to ensure that these conditions do not change.

REMEDIATION GOALS

EPA expects to return usable groundwater to its beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site. Generally, remediation goals are established by ARARs, such as Federal or State standards for drinking water quality. At this site, meeting those remediation goals is technically impracticable from an engineering perspective, and a restoration objective is not appropriate; therefore, an ARARs waiver is being invoked in this decision document (see the Selected Remedy section). Federal MCLs and State of New Jersey Remediation Standards will not be met within the TI zone.

To meet the RAOs defined above, EPA has identified remediation goals to aid in defining the extent of contaminated media requiring remedial action. To meet the "exposure control" and "aqueous plume remediation" RAOs defined above, EPA has identified remediation goals to aid in defining the extent of contaminated groundwater. In general, remediation goals establish media-specific concentrations of site contaminants that will pose no unacceptable risk to human health and the environment. For each constituent, the lower of the EPA federal MCLs or New Jersey Remediation Standards for Groundwater was selected as the remediation goal for groundwater, listed in Table 7. These remediation goals would be used for developing use restrictions and other actions to prevent exposure to, and for assessing the extent of (or expansion of) the site-related aqueous plume, but not for achieving restoration of the groundwater. At this site, non-site-related contamination may limit EPA's ability to establish boundary monitoring wells for the TI zone in which the groundwater meets MCLs. As such, EPA is establishing the remediation goals identified on Table 7 or anthropogenic background levels (whichever is higher) as the levels that define the boundary of the TI zone.

These remediation goals are relevant to the "source control" RAOs defined above, though in a different way. The FS considered whether a treatment action (as opposed to containment) would achieve these remediation goals in at least a portion of the targeted "contaminant source areas." More important, however, the FS explored whether removing or containing contaminant mass in one part of the aquifer might improve overall groundwater quality, possibly achieving the remediation goals, for some down-gradient part of the contaminated aquifer in a reasonable timeframe. One of the alternatives considered for this site (Alternative 3) includes hydraulic containment in the "contaminant source area," and another (Alternative 4) includes treatment in the "contaminant source area."

Surface Water
Based upon water level measurements, groundwater may be discharging to Bound Brook near the site. The potential for groundwater constituents to migrate to surface water and sediments in the Bound Brook is being evaluated as part of the OU4 RI/FS.

Groundwater RAOs related to a possible surface water discharge pathway cannot be fully evaluated until the OU4 RI field work and subsequent risk assessments are completed. Should a response action related to groundwater discharge to Bound Brook be needed, it will be considered in the OU4 FS.

DESCRIPTION OF ALTERNATIVES

Common Elements

All the alternatives except “no action” include common components to address “exposure control.” Because any combination of remedial alternatives will result in some contaminants remaining on the site above levels that would allow for unrestricted use, five-year reviews will be conducted. In addition, institutional controls such as a Classification Exception Area (CEA) will be required for the affected groundwater as one component of maintaining the long-term protectiveness of the implemented remedy.

Exposure Control

Public water is available to residents and businesses throughout the study area, so exposure to contaminated groundwater through direct contact or ingestion or inhalation would only occur as a result of direct exposure from an older, private well. (EPA’s efforts to locate private wells are discussed elsewhere in this ROD.) Vapor intrusion is not currently a site pathway for contaminant migration or inhalation exposure. The primary RAO with respect to groundwater is to prevent unacceptable risks to receptors by preventing exposure to groundwater contaminants. This includes encouraging the use of existing public drinking water supplies that are already treated and frequently tested, and surveying older private wells that may still remain in the area, including wells that might be used privately for non-potable uses (e.g., lawn watering) to ensure that they do not provide a conduit to exposure.

All the alternatives, with the exception of the “no action” alternative, include groundwater monitoring. Monitoring would be performed primarily using wells that are already in place. The most-distant monitoring well installed, MW-23, still has elevated VOC levels; therefore, monitoring points further down-gradient would be needed. However, note that MW-23 is well within the zone of influence of the Park Avenue wellfield, and that there are other sources of the same VOCs within the aquifer. For wells further down-gradient than MW-23, it will become difficult to distinguish VOCs that might be coming from the CDE plume or from some other nearby source.

All the alternatives, with the exception of the “no action” alternative, include periodic vapor intrusion testing. While EPA has already performed extensive vapor intrusion testing in areas likely to have been affected (within the footprint of the shallow plume), under any active remedy, EPA would require additional testing to assure that conditions do not change and that there is not an exposure pathway through vapor intrusion.

Aqueous Plume Remediation

As discussed earlier, the RI concludes that the aqueous plume is not currently expanding, due to the age of the contaminant plume and the ongoing draw of public water supply pumping wells. As part of any active remedy, monitoring would be required to confirm that this conclusion is valid, and to identify changes that might occur in the future that might cause the plume to expand beyond its current limits. In addition to the groundwater monitoring discussed earlier, the remedy would monitor the rates of pumping of public water supply wells in the area and assess the effects of changes in pumping. For example, closing a public water supply wellfield or, alternatively, the startup of a new public water supply pumping center outside the contaminant plume, would have the potential to change the extent of the contaminant plume. In addition, the remedy would also monitor the influent concentrations at nearby public water supply wells for changes in VOC levels, as additional evidence that the plume is, in fact, not expanding.

Should monitoring indicate that the plume is actually expanding, EPA would have limited options at its disposal, in the form of some kind of hydraulic containment. Given the current size of the CDE groundwater plume, effective hydraulic containment required might need to be on a massive scale, pumping the aquifer in a way that would be akin to, and would compete with, local public water supply wells. For example, the hydraulic containment alternatives discussed below would be designed for less than 50 gallons per minute (50 gpm) of pumping, or 72,000 gallons per day; in contrast, attaining hydraulic control of the entire plume could require pumping on the order of one to two million gallons per day.

Should EPA determine that some form of hydraulic containment is called for, EPA would consider restarting the currently inactive Spring Lake wellfield, in collaboration with MWC, rather than building a new hydraulic containment system essentially at this same location. Groundwater modeling performed as part of the RI indicated that, when it was active, the Spring Lake wells did control the flow of groundwater from the site, and the zone of influence appears to have been large enough to assert hydraulic control to the current extent of the groundwater plume. This would need to be verified, and additional pumping might be needed. The Spring Lake wellfield has its own treatment system that is likely to require modification before it could be restarted.

This scenario is described here to better define the purpose of the monitoring that would be part of any active remedy. At this stage, it is EPA's position that hydraulic containment of the plume is not necessary. EPA would present additional findings to the public, and sign a decision document, before undertaking such an action.

Further Source Control

The active components of Alternatives 3 and 4 focus on achieving the "source control" RAOs discussed above. Potential applicable technologies were identified and screened using effectiveness, implementability and cost as criteria, with emphasis on the effectiveness of the remedial action. Those technologies that passed the initial screening were then assembled into four remedial alternatives. *In-situ* VOC destruction technologies typically associated with the treatment of VOC plumes, such as in-situ chemical oxidation or enhanced biodegradation, did not survive this screening process, because they had no capacity to treat the VOCs trapped within the pore spaces of the rock matrix, the zone of the bedrock that is currently retaining the bulk of the contaminant mass. The FS concluded that aquifer heating, as discussed in Alternative 4, had the best chance of drawing VOCs out of the rock matrix within a reasonable timeframe.

Other Common Components

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, procure contracts for design and construction, or for subsequent operation and maintenance.

Alternative 1 - No Action

Capital Cost:	$0
Annual O&M Costs:	$0
Total Present Worth:	$0
Implementation Timeframe:	Not Applicable

Superfund regulations require that the "No Action" alternative be evaluated at every site to establish a baseline for comparison with other remedial alternatives. Under Alternative 1, no further remedial actions would be taken to address the groundwater. Alternative 1 does not include monitoring or institutional controls. Because no action results in contaminants remaining on site above acceptable levels with no controls, a review of the site at least every five years would be required.

Alternative 2 – Institutional Controls and Groundwater Monitoring

Capital Cost:	$1,529,000
Annual O&M Costs:	$190,700
Total Present Worth:	$5,721,000
Implementation Timeframe:	*1 Year*

Under this alternative, a long-term groundwater monitoring program would be instituted to collect data on contaminant concentrations and plume properties at the site. Groundwater samples would be collected, at least annually to start, and analyzed for VOCs, PCBs in representative wells, general water quality parameters, and natural attenuation parameters. Monitoring would also include coordinating with MWC and assessing changes in pumping or influent water quality to municipal systems. Institutional controls would include restricting the installation of new wells, identification and closure of any private potable wells in the plume area, with the intent to reduce potential future exposure to contaminants. Institutional controls would include a CEA, pursuant to NJDEP regulations. A review of site conditions would be conducted every five years that would include an evaluation of the extent of contamination and an assessment of contaminant migration and attenuation over time.

Monitoring under this remedial alternative would include periodic vapor intrusion testing, coupled with ongoing groundwater monitoring of the plume.

Alternative 3 – Hydraulic Containment of the “Contaminant Source Zone”

Alternative 3a Target:	*25,000 mg/l plume*
Capital Cost:	*$3,839,000*
Annual O&M Costs:	*$635,000*
Total Present Worth:	*$17,440,000*
Implementation Timeframe:	*1 Year*

Alternative 3b Target: 2,500 mg/l plume
Capital Cost: $5,271,000
Annual O&M Costs: $808,000
Total Present Worth: $21,019,000
Implementation Timeframe: 1 Year

Alternative 3 (a or b) involves controlling the discharge of contaminated groundwater from the "contaminant source zone" (either the 25,000 µg/L or 2,500 µg/L VOC area) to meet the "source control" RAOs. Alternative 3 also includes the monitoring and institutional controls discussed in Alternative 2.

For Alternative 3a, hydraulic control of groundwater could be accomplished by extracting contaminated groundwater at a rate of approximately seven gallons per minute (7 gpm) using one vertical extraction well, approximately 50 feet deep, located in the center of the treatment area (near the current well MW-14). For Alternative 3b, hydraulic control of groundwater could be accomplished by extracting contaminated groundwater at a rate of approximately 24 gpm via three vertical extraction wells, each approximately 50 feet deep, and located approximately as shown on Figure 8. An on-site water treatment system would treat the extracted groundwater. The groundwater treatment system is assumed to include oil-water separation (to remove NAPL), chemical or ultraviolet oxidation to treat organics (VOCs, PCBs, etc.), metals removal, followed by granular activated carbon (GAC) treatment as a polishing step prior to discharge to Bound Brook.

Hydraulic control through groundwater extraction would remove very little contaminant mass – only that which is present in the bedrock fractures in the area of hydraulic influence. The cost evaluation of Alternative 3a or 3b assumes a duration of 30 years, a default value used for most Superfund remedies for cost comparison between different alternatives. However, the time frame for back diffusion of contaminant mass (primarily TCE and cDCE) residing in the rock matrix back to the fractures is on the order of decades and centuries. Therefore, it is expected that hydraulic control/capture (along with the attendant treatment works) for both Alternatives 3a and 3b would be required indefinitely, assuming that it would continue while concentrations of contaminants exceed the remediation goals.

This "source control" alternative was evaluated to assess whether, by eliminating the "contaminant source area" through hydraulic control at the former CDE facility, areas down-gradient would show sufficient improvement over time to satisfy the RAO to "provide long-term improvement to the groundwater in a reasonable time frame." This evaluation was primarily based upon groundwater modeling, which can be used to predict groundwater conditions projected out into the future, using site-specific data about current conditions. The groundwater model predicted groundwater conditions 50 years from now and 100 years from now, under current conditions and with the hydraulic controls of Alternative 3a or 3b. The modeling indicated that removing either the smaller or larger "contaminant source area" at the former CDE facility would not change down-gradient groundwater conditions to any significant degree – no down-gradient areas would reach the remediation goals, or improve even marginally, with the hydraulic controls in place. The "contaminant source area" appears to have very little influence on down-gradient groundwater conditions over the long term, and "controlling the source" neither improves nor diminishes overall aquifer conditions to any significant degree.

Alternative 4 – Thermal Treatment of the "Contaminant Source Zone"

Alternative 4a Target:	*25,000 mg/l plume*
Capital Cost	*$27,340,000*
Annual O&M Costs:	*$190,700*
Total Present Worth:	*$33,061,000*
Implementation Timeframe:	*1 Year*

Alternative 4b Target:	*2,500 mg/l plume*
Capital Cost:	*$122,800,000*
Annual O&M Costs:	*$190,700*
Total Present Worth:	*$128,521,000*
Implementation Timeframe:	*3 Years*

Alternative 4 (a or b) involves thermal treatment of the "contaminant source zone" (either the 25,000 µg/L or 2,500 µg/L VOC area) to meet the "source control" RAOs. Alternative 4 also includes the monitoring and institutional controls discussed in Alternative 2. The FS developed a conceptual design with a target temperature for the aquifer of 100°C (212°F). At this temperature, VOCs in the treated area would be vaporized and mobilized to a series of vapor and fluid collection points.

The conceptual thermal treatment design includes the following major components:

- Installation of heater wells, vertical soil vapor extraction (SVE) points and multiphase extraction (MPE) wells to treat to a depth of 50 feet. The heater wells would be installed at a 15-foot spacing, and the heater wells would generate very high temperatures (in excess of 500°C/932°F), heating the spaces between the wells to the target temperature.

- Installation of steam injection wells and MPE wells between 50 and approximately 65 feet bgs. The steam wells would be installed at a 30-foot spacing.

- If needed, a vapor cap would be installed to extend slightly beyond the boundaries of the treatment area, to capture fugitive vapors.

- Thermal oxidation is assumed for use as an above-ground vapor and fluid treatment technology, and liquid GAC is included for the liquid treatment.

By constantly drawing off the vapors, the entire treatment zone is kept under a vacuum to minimize transport of contaminants out of the treatment area.

The use of steam at the bottom of the thermal treatment area creates a "hot floor" to provide a barrier to vertical migration of contaminants. At 100°C, dissolved phase and DNAPL VOCs would be vaporized and removed as a vapor or a mobilized liquid via the collection network (SVE and MPE wells).

Although a portion of the PCBs would likely also be removed, higher temperatures would be needed to obtain reliable removal of PCBs. Temperatures higher than 100°C are only attainable if the aquifer is dewatered, which is not feasible given the highly transmissive weathered rock zone at 65 feet bgs. The fate of contaminant mass located within the rock matrix is uncertain; however, it is assumed that at least a portion of the contaminant mass within the rock matrix would be volatilized out of the rock matrix and be captured by the SVE and MPE wells.

For Alternative 4a (approximately 2 acres), implementation of the remedy is estimated to take approximately 12 months, including time required to drill the various wells and heating points, the time required to bring the aquifer up to the target temperature, and time to demobilize. The active treatment of the aquifer would require approximately five months of that time period.

For Alternative 4b, which is approximately five times larger than Alternative 4a, it is assumed that the treatment area would be divided into five zones, each one encompassing approximately the same size as Alternative 4a, and that they would be treated in sequence. Thermal treatment would be performed starting in areas of highest contaminant concentrations and moving out to zones with lower concentrations. The duration of thermal treatment for Alternative 4b would be approximately 36 months. It is anticipated that up to 3,000 heater wells and hundreds of SVE wells, MPE wells, and steam injection wells would be required to implement thermal treatment over the large area that comprises the 2,500 μg/L VOC plume for Alternative 4b.

Unlike Alternative 3 (hydraulic control), thermal treatment has the potential to remove much of the VOC contaminant mass in the treated area in a relatively short period of time, though the types of heating technologies currently available have not been attempted in an area even as large as Alternative 4a. Additional rock core testing would be required after implementation to gauge the effectiveness of thermal treatment in removing mass from the rock matrix.

As with Alternative 3 (hydraulic containment), Alternative 4 was evaluated to assess if, by treating the “contaminant source area,” the action would “provide long-term improvement to the groundwater in a reasonable time frame.” For the purpose of this evaluation, the action was presumed to be 100 percent successful, with an equivalent result to hydraulic containment. Nevertheless, the modeling indicates that removing either the smaller or larger “contaminant source area” would not change down-gradient groundwater conditions to any significant degree.

There are several noteworthy limitations to this alternative. The target treatment depth for both Alternatives 4a and 4b is to 65 feet bgs, constrained by the highly transmissive fracture zone that starts at about that depth. This fracture zone is a major contaminant mass transport network and the amount of contaminant mass entrained in the rock and fractures below this zone drops off significantly. Nevertheless, higher VOC concentrations found below this fracture zone cannot be successfully treated by thermal treatment. In addition, the 2,500 μg/L VOC plume extends beyond the northeast CDE facility boundary, and it would not be technically feasible to install the infrastructure needed for thermal treatment at the Bound Brook or in the railroad right-of-way.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual response measure against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each response measure against the criteria.

Threshold Criteria *– The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy.*

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1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternative 1, the no action alternative, is not protective of human health and the environment because it does not eliminate, reduce, or control risks posed by the site through treatment, engineering controls, or institutional controls. Alternative 2, long-term groundwater monitoring and institutional controls, would be protective of human health and the environment by eliminating any existing pathways and the implementation of institutional controls. Alternatives 3a/3b and 4a/4b also include institutional controls to mitigate potential risks resulting from exposure to groundwater; thus, Alternatives 2 through 4 would be protective of human health and the environment.

"Overall protection of human health and the environment" also assesses the degree to which the remedial alternatives achieve the applicable remedial action objectives (RAOs). None of the alternatives, including Alternative 3 or Alternative 4 appear likely to satisfy the "source control" RAOs. While some reduction in mass or migration potential is achieved by Alternatives 3 and 4, EPA's modeling indicates that treating the targeted source zones would not improve conditions in down-gradient segments of the aquifer. Given that, in the case of Alternative 4b, this source zone is the largest that might be addressed by a site remedy, further source remediation (beyond that already achieved by the OU2 remedy) offers little potential to improve site conditions.

Because Alternative 1 (No Action) is not protective of human health and the environment, it was eliminated from consideration under the remaining evaluation criteria.

2. Compliance with applicable or relevant and appropriate requirements (ARARs)

Section 121(d) of CERCLA and NCP §300.430(f) (ii) (B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner, and are more stringent than Federal requirements, may be relevant and appropriate.

Compliance with ARARs address whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

State and Federal drinking water standards are considered ARARs for groundwater at this site. Experience at similar sites with matrix diffusion of VOCs or PCB contaminants in bedrock indicates that addressing the site with currently available technologies cannot achieve the ARARs for groundwater within a reasonable time period. Because groundwater restoration is technically impracticable, EPA is recommending an ARAR waiver for the groundwater.

Alternatives 3 and 4 are limited in scope, attempting to address the area of the bedrock where the highest contaminant mass is found. They are not meant to achieve ARARs even in these limited treatment zones. Alternative 3a or 3b would not significantly change contaminant concentrations in the bedrock, because groundwater extraction only affects water in the fractures and draws almost no contaminant mass from the rock matrix. Hydraulic containment is expected to reduce the migration of VOCs, but only from the treated zone. Hydraulic containment would have very little influence on the extensive contaminant mass beyond the fractures directly affected by pumping. In addition, the limited effectiveness of hydraulic containment would end as soon as the system was turned off, requiring that the extraction/treatment remedy operate indefinitely.

Under Alternative 4, contaminant concentrations in the treated area of the bedrock would be expected to decrease over a relatively short period of time as a result of the treatment. The high intensity application of heat would be expected to remove much of the diffused and dissolved phase VOCs, but only within the treated zone and not within the aquifer as a whole. The target aquifer temperature would not remove PCBs within the aquifer, and the dewatering needed to achieve higher temperatures is not technically feasible. Thermal treatment also has several technical limitations with regard to the depth and surficial area that can be treated, so even the relatively limited treatment areas evaluated for OU3 would be beyond the scope of this technology. Given these factors, and the potential for partial recontamination after the completion of Alternative 4a or 4b (through back diffusion from neighboring untreated zones), it is highly unlikely that ARARs would be achieved under Alternative 4 for the whole treatment zone.

No other major ARAR considerations affect remedial decision-making. Alternatives 3 and 4 would be completed in compliance with chemical-specific ARARs (other than those subject to the waiver), as well as action-specific and location-specific ARARs, such as requirements of the Clean Air Act that would apply to air emissions associated with the treatment of groundwater, requirements of the Resource Conservation and Recovery Act that would apply to management and disposal of treatment residuals, and requirements to protect wetlands, such as the Floodplain Management Executive Order, Protection of Wetlands Executive Order, and the "Freshwater Wetlands Protection Act Rules." No action-specific or location-specific ARARs apply to Alternative 2.

A complete list of ARARs can be found in Table 8 of this ROD.

Primary Balancing Criteria *– The next five criteria, criteria 3 through 7, are known as "primary balancing criteria". These criteria are factors by which tradeoffs between response measures are assessed so that the best options will be chosen, given site-specific data and conditions.*

3. Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Groundwater modeling indicates that treatment of either of the "contaminant source areas" – areas with the highest contaminant concentrations in bedrock groundwater - will have little, if any, impact on the persistence of the down-gradient plume. While some minor reduction in contaminant mass within the plume would be achieved through treatment (particularly through Alternative 4a or 4b), concentrations would still remain elevated for very long time periods (*i.e.*, on the order of several hundred years). Thus, although Alternatives 3a, 3b, 4a, and 4b may locally improve groundwater quality, the long-term effectiveness of all the active alternatives over the entire OU3 area, including Alternative 2 (monitoring, institutional controls), would be the same.

Treatment of bedrock limited to the area beneath the overburden source area (*i.e.*, at MW-14S/D) would have negligible impact on the remainder of the down-gradient plume and would not result in the achievement of ARARs since the bedrock matrix itself is the source of the ongoing exceedance of ARARs. Therefore, to be potentially capable of meeting ARARs, a remedial technology would have to be applied over the entire OU3 area where bedrock matrix contamination contributes to ongoing exceedances of

ARARs. The implementation of any of *in-situ* remediation technology over such an area is not practicable.

The long-term effectiveness of natural attenuation processes was also evaluated through groundwater modeling. The model indicates that VOCs will persist at concentrations exceeding ARARs for very long time periods, because the rates at which these natural processes (diffusion, dispersion and biological degradation) work is very slow. The slow rate of natural attenuation is substantially the result of matrix diffusion, but the lack of plume migration is also due to the effects of matrix diffusion.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative 2 would not satisfy CERCLA's preference for remedies that include on-site treatment as a principal element, though for this site, the OU2 remedy included treatment of source material in the soils as a principal element. Alternatives 4a and 4b (Thermal Treatment) would partially meet the preference in CERCLA for treatment on site and would result in a reduction in the volume of VOCs in the treatment areas, and a partial reduction in mobility of VOCs to down-gradient portions of the plume. Alternatives 3a and 3b (Hydraulic Control) would result in a reduction of mobility of contaminants to down-gradient portions of the plume as long as the system was in operation. Overall, however, performing additional "source control" actions in the groundwater shows little or no potential for measureable improvement to the aquifer as a whole, relative to the soil source control action already completed under the OU2 remedy.

5. Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternatives 3a and 3b (Hydraulic Control) and 4a and 4b (Thermal Treatment) would involve construction and/or in-situ treatment hazards that could pose a greater risk to site workers or the surrounding environment than Alternative 2. However, it is anticipated that these risks could be mitigated through the use of engineering controls, safe work practices, and personal protective equipment. All of the alternatives except

Alternative 1 (No Action) involve the drilling and sampling of monitoring wells, which is expected to pose minimal risks to site workers and the surrounding environment.

Construction of Alternative 4 would result in the most significant short-term effects in the community, with the installation of wells, piping, treatment works and possibly capping throughout the treatment areas. This alternative would require sufficient surface infrastructure that it could only be implemented in relatively open areas like the 26-acre site. Alternative 4 would have a major short-term impact on the Borough's redevelopment plans for the former CDE facility, as these plans would probably need to be delayed until the completion of the remedial action.

6. Implementability
Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 2 (Institutional Controls and Groundwater Monitoring) could be readily implemented using commonly available technologies and with minimal design or permitting. Alternatives 3a and 3b (Hydraulic Control) could also be readily implemented. Alternatives 4a and 4b would likely be the most difficult to implement due to the energy, regulatory, and heating controls/infrastructure required. Alternative 4b would be especially difficult to implement because it is uncommon to perform thermal treatment over such a large area; it would require installation of up to 3,000 heater wells and hundreds of SVE wells, MPE wells, and steam injection wells. The installation of this many borings and then subsequent abandonment of all of the wells poses implementation complexities. It is also uncertain to what extent thermal heating would effectively remove contaminant mass from the rock matrix.

As discussed in the description of Alternative 4, the 2,500 μg/L treatment area has been slightly modified because the remedial alternative is not physically implementable over the entire area (e.g., it is not technically implementable to perform thermal treatment in a residential area or in an area adjacent to a stream, and it is depth-limited by the highly transmissive fracture zone).

7. Cost

Includes estimated capital and O&M costs, and net present worth value of capital and O&M costs.

The estimated present worth cost of Alternative 2 is $5,721,000. This cost includes costs associated with the installation of several additional monitoring wells, the sampling and analysis for contamination in the groundwater, and operation and maintenance (O&M) costs over a 30-year period. Although Alternative 2 anticipates installation of only four additional wells followed by regular monitoring of the new wells and existing wells, the monitoring program to support the alternative is extensive. The estimated present worth cost of Alternative 3a is $17,440,000. This cost includes the costs mentioned in Alternative 2 with the addition of the installation and O&M of the hydraulic containment system. Alternative 3b has a similar scope over an increased treatment area from 3a to 3b, though the larger treatment area results in a relatively small difference in present worth cost, $21,019,000. This is because of economies of scale associated with building the larger treatment plant.

The estimated present worth cost of Alternative 4a is $33,061,000. This cost also includes the costs associated with Alternative 2 plus the construction of the heating infrastructure, treatment works, associated piping, and heating and collection wells, along with O&M costs for the monitoring program over a 30-year period.

The estimated present worth cost of Alternative 4b is $128,521,000, reflecting a similar scope to Alternative 4a, over an area roughly five times larger. It is expected that a similar scale of equipment would be constructed as anticipated for Alternative 4a, and that the treatment would take place in phases across the site.

For costing purposes, each alternative has an estimated duration of 30 years although, as discussed above, it is anticipated that contaminant concentrations will exceed ARARs for much longer time periods. The FS performed a cost sensitivity analysis particularly focusing on this issue of the “real” cost of a remedy over the long term, as well as the discount factor used for present value calculations. Not surprisingly, adjusting the implementation duration and the discount factor made the greatest difference in the cost of Alternative 3a/3b, which would require long-term O&M, and eventual replacement of worn out equipment, for a hydraulic containment system that would need to continue operating indefinitely.

Modifying Criteria *– The final two evaluation criteria, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.*

8. State Acceptance

Indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure.

The State of New Jersey concurs with the selected remedy.

9. Community Acceptance

Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.

EPA solicited input from the community on the remedial response measures proposed for the site. Oral comments were recorded from attendees of the public meeting, and written comments were received during the public comment period.

Appendix IV, the Responsiveness Summary, addresses all comments received, both verbal and written.

PRINCIPAL THREAT WASTE

Source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration to groundwater, surface water or as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or mobile, that generally cannot be reliably contained or present a significant risk to human health or the environment should exposure occur.

Contaminated groundwater at the site is not considered source material and therefore is not a principal threat waste. The OU2 remedy addressed principal threats at the site.

SELECTED REMEDY

Based upon consideration of the results of the OU3 Site investigations, the requirements of CERCLA, the detailed analysis of the remedial alternatives and public comments, EPA has determined that Alternative 2 (Institutional Controls and Groundwater Monitoring) is the appropriate remedy for the groundwater at the site; however, the Agency is deferring its decision on a portion of the groundwater, as discussed in further detail below.

This remedy best satisfies the requirements of CERCLA Section 121 and the NCP's nine evaluation criteria for remedial alternative, 40 CFR § 300.430(e)(9). This remedy includes the following components:

- Prevention of exposure to site groundwater contamination, by continuing efforts to identify existing private wells within the OU3 study area, and by placing institutional controls in the form of a Classification Exception Area to prevent the installation of new drinking water wells;

- Implementation of a long-term sampling and analysis program to monitor the groundwater contamination at the site, in order to prevent exposure and assess groundwater migration; and

- Implementation of a long-term vapor intrusion monitoring program.

EPA evaluated alternatives for restoration of groundwater to meet ARARs and concluded that no practicable alternatives could be implemented. Consequently, EPA is invoking an ARAR waiver for the groundwater at the site due to technical impracticability (except for an area of groundwater discharging to Bound Brook, as discussed below).

The estimated cost of the selected remedy for OU3 is $5,721,000. A detailed breakdown of this estimated cost is included in Table 9 of this ROD.

Deferred Groundwater Decision: The OU3 RI concludes that groundwater currently discharges to Bound Brook near the CDE facility (OU2). EPA acknowledges that this is an area of uncertainty, identified by a number of commenters to the Proposed Plan. The OU4 investigations, including the human health and ecological risk assessments, will evaluate whether contaminated groundwater that may be discharging into Bound Brook poses an unacceptable risk to human health and the environment. Depending upon the results of the OU4 RI/FS, additional groundwater actions may be contemplated as part of an OU4 remedy. EPA is deferring action on the area of the groundwater that has the potential to discharge to Bound Brook. OU4 will evaluate all potential contaminants of concern, but this deferral is based upon uncertainties about the fate and transport of PCBs, which have already been identified as a potential contaminant of concern for the Brook, and not VOCs. Based upon OU3 RI data, the deferred action includes shallow groundwater (to a depth of approximately 65 feet bgs, associated with the pronounced fracture zone found beneath the CDE facility at that depth) in the vicinity of the CDE facility. The lateral boundaries of the area subject to deferred action, and thus not subject to the TI waiver in this document, include the surface water recharge zone to Bound Brook indicated on Figure 3. The actual extent of the recharge zone will be defined in the OU4 RI.

Based on the information available at this time, EPA believes the selected remedy provides the best balance of trade-offs among the remedial alternatives with respect to the nine evaluation criteria. EPA believes that the selected remedy will be protective of human health and the environment (notwithstanding that ARARS will not be met due to technical impracticability), will be cost effective, and will utilize permanent solutions and alternative treatment technologies to the maximum extent practicable.

The preference for Alternative 2 is based upon three factors: (1) the technical impracticability of successfully treating VOC and PCB contamination in fractured bedrock with extensive evidence of matrix diffusion into the rock over a wide area; (2) the expected limited ability of the groundwater contamination to move beyond its current extent; and, (3) the limited potential for treatment or containment of even the “contaminant source area” to result in a measureable improvement in groundwater quality anywhere in the aquifer within a reasonable time period.

Data from the RI/FS suggests that the contaminant plume is not expected to expand beyond its current limits. Should monitoring indicate that the plume is actually expanding, EPA would have limited options at its disposal, in the form of some kind of hydraulic containment. Should EPA determine that some form of hydraulic containment is called for, EPA, in collaboration with MWC, would evaluate restarting the currently inactive Spring

Lake wellfield, rather than building a new hydraulic containment system. At this time, it is EPA's position that hydraulic containment of the plume is not necessary and EPA is not proposing use of the Spring Lake wellfield as a contingency to the selected remedy. EPA would present additional findings to the public before undertaking such an action.

In addition, groundwater monitoring will assess the possibility that contamination from other sources may be encountered in wells further away from the former CDE facility, and, if other potential sources are identified, coordinate with NJDEP regarding other response actions.

Green Remediation
Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of the selected remedy.

STATUTORY DETERMINATIONS

As was previously noted, CERCLA §121(b)(1) mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA §121(d) further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to §121(d)(4).

Protection of Human Health and the Environment
The selected remedy, Alternative 2 (Institutional Controls and groundwater monitoring), will be protective of human health and the environment by preventing exposure. Groundwater monitoring and use restrictions ensure that contaminated groundwater will not adversely impact human health and the environment through direct contact or as a source of drinking water.

Implementation of the selected remedy will not pose unacceptable short-term or adverse cross-media impacts.

Compliance with ARARs
Because restoration of the groundwater to beneficial uses is not practical, EPA is invoking an ARAR waiver of groundwater and

drinking water chemical-specific ARARs for an area of contaminated groundwater affected by site contaminants, due to technical impracticability. The list of site contaminants addressed by the ARAR waiver are included in Table 7. The basis for EPA's determination of technical impracticability is explained in the Selected Remedy section of this Decision Summary, and at greater length in the TI Evaluation Report. Vertically, the depth of the TI zone varies. At its deepest, the ARAR waiver includes all groundwater from the water table (typically about 20 feet bgs) down to an elevation that corresponds to five feet below the deepest detected groundwater contamination in bedrock, approximately 400 feet bgs. The lateral extent of the ARAR waiver, an area of approximately 825 acres is depicted in Figure 2. Excluded is that portion of the groundwater that may discharge to Bound Brook. The boundaries of this TI exclusion area are described in the Selected Remedy section of this Decision Summary. A TI determination for this area will be made as part of the OU4 Bound Brook remedy decision.

Use of the groundwater within this area will be restricted through institutional controls, preventing exposure to contamination in excess of state and federal drinking water standards. Long-term groundwater monitoring will be conducted to evaluate the extent of the contaminant plume, evaluate reductions in contaminant concentrations, if any, and assure that the groundwater conditions that served as the basis for the remedy selection do not change over time.

A comprehensive ARAR discussion is included in the FS and a complete listing of ARARs is included in Table 8 of this ROD. Highlights of ARARs:

- Action Specific ARARs -
    - None noted

- Chemical-Specific ARARs
    - New Jersey Remediation Standards for Groundwater, NJAC 7:26D
    - New Jersey Drinking Water Quality Act, NJAC 7:10-16 (State MCLs)
    - New Jersey Groundwater Quality Criteria, NJAC 7:9-16
    - Federal Safe Drinking Water Act, 40 CFR Part 141, drinking water standards (MCLs)

- Location-Specific ARARs
    - None noted

Cost Effectiveness
EPA has determined that the selected remedy is cost-effective and represents a reasonable value. In making this determination, the following definition was used: “A remedy shall be cost-effective if its costs are proportional to its overall effectiveness” (NCP §300.430.(f)(1)(ii)(D)). EPA evaluated the “overall effectiveness” of those alternatives that satisfied the threshold criteria (*i.e.*, were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short–term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of the selected remedy was determined to be proportional to costs and hence, this alternative represents a reasonable value.

Please refer to Table 9 for a summary of remedy costs for the selected remedy.

Utilization of Permanent Solutions and Alternative Treatment Technologies
EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. Of those alternatives that are protective of human health and the environment and comply with ARARs to the extent practicable, EPA has determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and State and community acceptance.

The selected remedy will provide adequate long-term control of risks to human health and the environment through preventing exposure to the contaminated groundwater. The selected remedy is protective of short-term risks.

Preference for Treatment as a Principal Element
The statutory preference for remedies that employ treatment as a principal element is not satisfied by the selected remedy.

Five-Year Review Requirements
Because the remedy will result in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, a

statutory review will be conducted within five years after initiation of the selected remedy to ensure that the remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for OU3 the Cornell-Dubilier Electronics site was released for public comment on July 20, 2012. EPA received a request to extend the public comment period, and extended the comment period from 30 to 60 days. The comment period closed on September 20, 2012.

The Proposed Plan identified Alternative 2 as EPA's preferred alternative.

EPA reviewed all verbal and written comments submitted during the public comment period. In response to the community input, EPA has made the following modifications to the remedy presented in the Proposed Plan:

- The selected remedy defers action on the area of the groundwater that has the potential to discharge to Bound Brook. EPA will evaluate additional information collected as part of the OU4 RI/FS (for the Bound Brook) prior to making a final remedy decision for this portion of the groundwater.

APPENDIX I
Tables and Figures

Table 1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Entire Aquifer

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Sitewide (Within and Outside the Boundaries of the Former CDE Facility)	cis-1,2-Dichloroethene	0.25 J	390,000 J	µg/L	224 / 261	14,139	µg/L	97.5% KM (Chebyshev) UCL
	Tetrachloroethene	0.12 J	1,600	µg/L	112 / 261	36	µg/L	95% KM (Chebyshev) UCL
	1,2,4-Trichlorobenzene	0.1 J	1,600 J	µg/L	44 / 258	58	µg/L	97.5% KM (Chebyshev) UCL
	Trichloroethene	0.28 J	170,000	µg/L	237 / 261	7,041	µg/L	97.5% KM (Chebyshev) UCL
	Vinyl chloride	0.36 J	860 J	µg/L	64 / 261	53	µg/L	97.5% KM (Chebyshev) UCL
	Dibenzo(a,h)anthracene	0.07 J	5.5	µg/L	31 / 260	0.17	µg/L	95% KM (t) UCL
	Total PCB Aroclors	0.031	12,900	µg/L	75 / 244	4.4	µg/L	97.5% KM (Chebyshev) UCL
	Heptachlor	0.06	300	µg/L	16 / 262	3.6	µg/L	97.5% KM (Chebyshev) UCL
	2,3,7,8-TCDD Toxic Equivalence (TEQ) [1]	8.1E-10 J	2.2E-01	µg/L	42 / 45	2.6E-05	µg/L	99% Chebyshev (Mean, Sd) UCL
	Arsenic	0.68 J	829	µg/L	262 / 262	76	µg/L	95% Chebyshev (Mean, Sd) UCL

J - indicates an estimated value
[1] Represents the sum of dioxin/furan TEQ and PCB congeners TEQ. 95% UCL concentration was calculated using detected concentrations only.

Table 2
Selection of Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Groundwater	Entire Aquifer	Within and Outside the Boundaries of the Former CDE Facility - Tap Water and/or Process Water	Commercial / Industrial Worker	Adult	Dermal Contact	Quant	Potable, sanitary, and/or process use of the groundwater.
						Inhalation	Quant	
		Shallow Groundwater	Within and Outside the Boundaries of the Former CDE Facility - Top of the Groundwater Table	Construction/Utility Worker	Adult	Dermal Contact	Quant	Direct contact with bedrock groundwater during construction activities is unlikely. However, groundwater has been observed at depths less than 10 feet below ground surface, and shallow groundwater in the overburden may be hydraulically connected to groundwater in the highly fractured bedrock. This exposure scenario is therefore evaluated using the shallow bedrock groundwater data.
						Inhalation	Quant	
		Entire Aquifer	Outside the Boundaries of the Former CDE Facility - Tap Water	Resident	Adult	Ingestion	Quant	Potable and/or sanitary use of the groundwater.
						Dermal Contact	Quant	
						Inhalation	Quant	
					Child	Ingestion	Quant	Potable and/or sanitary use of the groundwater.
						Dermal Contact	Quant	
						Inhalation	Quant	
		Air	Within and Outside the Boundaries of the Former CDE Facility - Vapors in Indoor Air	Commercial / Industrial Worker	Adult	Inhalation	None	Volatile chemicals in groundwater may enter indoor spaces through building foundations. However, this exposure pathway is being addressed by the USEPA separate from the RI.
			Outside the Boundaries of the Former CDE Facility - Vapors in Indoor Air	Resident	Adult	Inhalation	None	Volatile chemicals in groundwater may enter indoor spaces through building foundations. However, this exposure pathway is being addressed by the USEPA separate from the RI.
					Child	Inhalation	None	
			Within and Outside the Boundaries of the Former CDE Facility - Vapors in Outdoor Air	Commercial / Industrial Worker	Adult	Inhalation	Qual	Volatile chemicals in groundwater may volatilize and be passively released to outdoor air. However, as there are uncertainties associated with quantitatively modeling ambient air concentrations following volatilization from groundwater that may include DNAPL in fractured bedrock, the analysis is qualitative.
				Construction/Utility Worker	Adult	Inhalation	Qual	
			Outside the Boundaries of the Former CDE Facility - Vapor in Outdoor Air	Resident	Adult	Inhalation	Qual	
					Child	Inhalation	Qual	

Table 2 (cont'd)
Selection of Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Groundwater	Surface Water	Bound Brook	Recreationist	Adolescent	Ingestion	None	Exposure pathways related to surface water and sediment will be addressed in OU4.
						Dermal Contact	None	
						Inhalation	None	
		Sediment	Bound Brook	Recreationist	Adolescent	Ingestion	None	
						Dermal Contact	None	
						Inhalation	None	

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Table 3
Non-Cancer Toxicity Data Summary

Pathway: Ingestion/Dermal

Chemicals of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Absorp. Efficiency (Dermal)	Adjusted RfD (Dermal)	Adj. Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Dates of RfD
cis-1,2-Dichloroethene	Chronic	2.0E-03	mg/kg-day	1	2.0E-03	mg/kg-day	Increased kidney weight	3,000	IRIS	1/25/2011
	Subchronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Increased kidney weight	300	IRIS	1/25/2011
Tetrachloroethene	Chronic	1.0E-02	mg/kg-day	1	1.0E-02	mg/kg-day	Liver toxicity	1,000	IRIS	1/25/2011
	Subchronic	1.0E-01	mg/kg-day	1	1.0E-01	mg/kg-day	Liver toxicity	100	IRIS	1/25/2011
1,2,4-Trichlorobenzene	Chronic	1.0E-02	mg/kg-day	1	1.0E-02	mg/kg-day	Increased adrenal weights	1,000	IRIS	1/25/2011
	Subchronic	1.0E-01	mg/kg-day	1	1.0E-01	mg/kg-day	Increased adrenal weights	100	IRIS	1/25/2011
Trichloroethene	--	N/A	--	--	N/A	--	--	--		
Vinyl chloride	Chronic	3.0E-03	mg/kg-day	1	3.0E-03	mg/kg-day	Liver cell polymorphism	30	IRIS	1/25/2011
Dibenzo(a,h)anthracene	--	N/A	--	--	N/A	--	--	--		
Total PCBs	Chronic	2.0E-05	mg/kg-day	1	2.0E-05	mg/kg-day	Eye effects; finger and toe nail effects; immunological effects	300	IRIS	1/25/2011
	Subchronic	6.0E-05	mg/kg-day	1	6.0E-05	mg/kg-day	Eye effects; finger and toe nail effects; immunological effects	100	IRIS	1/25/2011
2,3,7,8-TCDD	Chronic	1.0E-09	mg/kg-day	1	1E-09	mg/kg-day	Developmental effects	90	ATSDR	12/1/2009
	Subchronic	2.0E-08	mg/kg-day	1	2E-08	mg/kg-day	Lymphoreticular effects	30	ATSDR	12/1/2009
Heptachlor	Chronic	5.0E-04	mg/kg-day	1	5.0E-04	mg/kg-day	Increased liver weight	300	IRIS	1/25/2011
Arsenic	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Hyperpigmentation, keratosis	3	IRIS	1/25/2011

Table 3 (cont'd) Non-Cancer Toxicity Data Summary									
Pathway: Inhalation									
Chemicals of Concern	**Chronic/ Subchronic**	**Inhalation RfC**	**Inhalation RfC Units**	**Inhalation RfD (If available)**	**Inhalation RfD Units (If available)**	**Primary Target Organ**	**Combined Uncertainty /Modifying Factors**	**Sources of RfD Target Organ**	**Dates of RfC**
cis-1,2-Dichloroethene	Chronic	N/A	--	--	--	--	--	NCEA	2/3/2011
	Subchronic	N/A	--	--	--	--	--	NCEA	2/3/2011
Tetrachloroethene	Chronic	2.7E-01	mg/m^3	--	--	Neurological	100	ATSDR	12/1/2009
1,2,4-Trichlorobenzene	Chronic	2E-03	mg/m^3	--	--	Blood	--	--	--
	Subchronic	2E-02	mg/m^3	--	--	Blood	--	--	--
Trichloroethene	Chronic	N/A	--	--	--	--	--	--	--
	Subchronic	N/A	--	--	--	--	--	--	--
Vinyl chloride	Chronic	1.0E-01	mg/m^3	--	--	Liver cell polymorphism	30	IRIS	1/25/2011
	Subchronic [1]	7.7E-02	mg/m^3	--	--	Liver effects	30	ATSDR	12/1/2009
Dibenzo(a,h)anthracene	--	N/A	--	--	--	--	--	--	--
Total PCBs	--	N/A	--	--	--	--	--	--	--
2,3,7,8-TCDD	--	N/A	--	--	--	--	--	--	--
Heptachlor	--	N/A	--	--	--	--	--	--	--
Arsenic	Chronic	1.50E-05	mg/m^3	--	--	Development, cardiovascular system, nervous system	--	CalEPA	2/1/2011

[1] The subchronic RfC is from a different source than the chronic RfC. The subchronic value is lower than the chronic value and will therefore not be used in the noncancer hazard calculations.

Table 4
Cancer Toxicity Data Summary

Pathway: Ingestion/ Dermal

Chemical of Concern	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal)	Slope Factor Units	Weight of Evidence/ Cancer Guideline	Source	Date
cis-1,2-Dichloroethene	N/A	--	N/A	--	Inadequate information	NCEA	2/3/2011
Tetrachloroethene	5.4E-01	$(mg/kg\text{-}day)^{-1}$	5.4E-01	$(mg/kg\text{-}day)^{-1}$	--	CalEPA	2/1/2011
1,2,4-Trichlorobenzene	2.9E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-02	$(mg/kg\text{-}day)^{-1}$	D	NCEA	6/16/2009
Trichloroethene	5.9E-03	$(mg/kg\text{-}day)^{-1}$	5.9E-03	$(mg/kg\text{-}day)^{-1}$	--	CalEPA	2/1/2011
Vinyl chloride (for adult workers)	7.2E-01	$(mg/kg\text{-}day)^{-1}$	7.2E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	1/25/2011
Vinyl chloride (for adult and child residents)	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.5E+00	$(mg/kg\text{-}day)^{-1}$			
Dibenzo(a,h)anthracene	7.3E+00	$(mg/kg\text{-}day)^{-1}$	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	1/25/2011
Heptachlor	4.5E+00	$(mg/kg\text{-}day)^{-1}$	4.5E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	1/25/2011
Arsenic	1.5E+00	(mg/kg-day)-1	1.5E+00	(mg/kg-day)-1	A	IRIS	1/25/2011

Pathway: Inhalation

Chemical of Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline	Source	Date
cis-1,2-Dichloroethene	N/A	--	NA	--	Inadequate information	NCEA	2/3/2011
Tetrachloroethene	5.9E-06	$(\mu g/m^3)^{-1}$	NA	--	--	CalEPA	2/1/2011
1,2,4-Trichlorobenzene	N/A	--	NA	--	D	NCEA	6/16/2009
Trichloroethene	2.0E-06	$(\mu g/m^3)^{-1}$	NA	--	--	CalEPA	2/1/2011
Vinyl chloride (for adult workers)	4.4E-06	$(\mu g/m^3)^{-1}$	NA	--	A	IRIS	1/25/2011
Vinyl chloride (for adult and child residents)	8.8E-06	$(\mu g/m^3)^{-1}$	NA	--			
Dibenzo(a,h)anthracene	1.2E-03	$(\mu g/m^3)^{-1}$	NA	--	B2	CalEPA	2/1/2011
Polychlorinated biphenyls, total	1.0E-04	$(\mu g/m^3)^{-1}$	NA	--	B2	IRIS	1/25/2011
2,3,7,8-TCDD	3.3E+01	$(\mu g/m^3)^{-1}$	NA	--	B2	HEAST	7/1997
Heptachlor	1.3E-03	$(\mu g/m^3)^{-1}$	NA	--	B2	IRIS	1/25/2011
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	NA	--	A	IRIS	1/25/2011

Table 5
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Current/Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Process Water	cis-1,2-Dichloroethene	Kidney	N/A	--	1E+01	1E+01
			1,2,4-Trichlorobenzene	Kidney; Blood	N/A	1E+01	1E-01	1E+01
			Total PCB Aroclors	Eye; Developmental; Immunological	N/A	N/A	6E+01	6E+01
			2,3,7,8-TCDD Toxic Equivalence	Developmental	N/A	N/A	7E+00	7E+00

Scenario Timeframe: Current/Future
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Shallow Onsite GW	Top of GW Table	cis-1,2-Dichloroethene	Kidney	N/A	--	2E+01	2E+01
			Total PCB Aroclors	Eye; Developmental; Immunological	N/A	N/A	5E+01	5E+01

Scenario Timeframe: Current/Future
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Shallow Offsite GW (South of Brook)	Top of GW Table	Total PCB Aroclors	Eye; Developmental; Immunological	N/A	N/A	2E+01	2E+01

Scenario Timeframe: Current/Future
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Shallow Offsite GW (North of Brook)	Top of GW Table	Total PCB Aroclors	Eye; Developmental; Immunological	N/A	N/A	2E+00	2E+00

Table 5
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	cis-1,2-Dichloroethene	Kidney	2E+02	--	N/A	2E+02
			1,2,4-Trichlorobenzene	Kidney; Blood	2E-01	4E+00	1E-01	4E+00
			Total PCB Aroclors	Eye; Developmental; Immunological	6E+00	N/A	8E+01	8E+01
			2,3,7,8-TCDD Toxic Equivalence	Developmental	7E-01	N/A	1E+01	1E+01
			Arsenic	Skin; Developmental; Cardiovascular; Neurological	7E+00	N/A	2E-02	7E+00

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	cis-1,2-Dichloroethene	Kidney	5E+02	--	N/A	5E+02
			1,2,4-Trichlorobenzene	Kidney; Blood	4E-01	1E+01	3E-01	1E+01
			Total PCB Aroclors	Eye; Developmental; Immunological	1E+01	N/A	2E+02	2E+02
			2,3,7,8-TCDD Toxic Equivalence	Developmental	2E+00	N/A	2E+01	2E+01
			Arsenic	Skin; Developmental; Cardiovascular; Neurological	2E+01	N/A	5E-02	2E+01

Table 6
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current/Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Process Water	Trichloroethene	N/A	2E-03	4E-05	3E-03
			Dibenzo(a,h)anthracene	N/A	N/A	2E-04	2E-04
			Total PCB Aroclors	N/A	N/A	2E-04	2E-04
			2,3,7,8-TCDD Toxic Equivalence	N/A	N/A	4E-04	4E-04

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	Tetrachloroethene	3E-04	2E-05	1E-04	4E-04
			Trichloroethene	6E-04	1E-03	6E-05	2E-03
			Vinyl chloride	1E-03	4E-05	N/A	1E-03
			Dibenzo(a,h)anthracene	3E-05	N/A	3E-04	3E-04
			Total PCB Aroclors	3E-05	N/A	3E-04	4E-04
			Heptachlor	2E-04	N/A	7E-05	3E-04
			2,3,7,8-TCDD Toxic Equivalence	6E-05	N/A	8E-04	9E-04
			Arsenic	2E-03	N/A	4E-06	2E-03

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	Tetrachloroethene	1E-04	7E-06	4E-05	2E-04
			Trichloroethene	2E-04	5E-04	2E-05	7E-04
			Vinyl chloride	4E-04	2E-05	N/A	5E-04
			Dibenzo(a,h)anthracene	2E-05	N/A	3E-04	4E-04
			2,3,7,8-TCDD Toxic Equivalence	2E-05	N/A	3E-04	3E-04
			Arsenic	6E-04	N/A	2E-06	6E-04

TABLE 7
REMEDIATION GOALS
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Chemical of Concern	CAS No.	NJDEP Remediation Standards for Groundwater (ug/L)	NJDEP PQL (ug/L)	NJDEP Modified* Remediation Standards for Groundwater (ug/L)	Federal MCLs (ug/L)	NJDEP Drinking Water MCLs (ug/L)	Preliminary Remediation Goal (ug/L)
Volatile Organic Compounds							
1,1,2-Trichloroethane	79-00-5	3	2	3	5	3	3
1,1-Dichloroethene	75-35-4	1	1	1	7	2	1
1,2,4-Trichlorobenzene	120-82-1	9	1	9	70	9	9
1,2-Dibromo-3-chloropropane	96-12-8	0.02	0.02	0.02	0.2	0.2	0.02
1,2-Dichloroethane	107-06-2	0.3	2	2	5	2	2
1,4-Dichlorobenzene	106-46-7	75	5	75	75	75	75
Benzene	71-43-2	0.2	1	1	5	1	1
Bromodichloromethane	75-27-4	0.6	1	1	80	NA	1
Chlorobenzene	108-90-7	50	1	50	100	50	50
Chloroform	67-66-3	70	1	70	80	NA	70
cis-1,2-Dichloroethene	156-59-2	70	1	70	70	70	70
Dibromochloromethane	124-48-1	0.4	1	1	80	NA	1
Methyl tert-butyl ether	1634-04-4	70	1	70	NA	70	70
Methylene chloride	75-09-2	3	1	3	5	3	3
Tetrachloroethene	127-18-4	0.4	1	1	5	1	1
trans-1,2-Dichloroethene	156-60-5	100	1	100	100	100	100
Trichloroethene	79-01-6	1	1	1	5	1	1
Vinyl chloride	75-01-4	0.08	1	1	2	2	1
Semi-Volatile Organic Compounds							
Benzo(a)anthracene	56-55-3	0.05	0.1	0.1	NA	NA	0.1
Benzo(a)pyrene	50-32-8	0.005	0.1	0.1	0.2	0.2	0.1
Benzo(b)fluoranthene	205-99-2	0.05	0.2	0.2	NA	NA	0.2
Benzo(k)fluoranthene	207-08-9	0.5	0.3	0.5	NA	NA	0.5
bis(2-Ethylhexyl)phthalate	117-81-7	2	3	3	6	6	3
Dibenzo(a,h)anthracene	53-70-3	0.005	0.3	0.3	NA	NA	0.3
Indeno(1,2,3-cd)pyrene	193-39-5	0.05	0.2	0.2	NA	NA	0.2
Polychlorinated Biphenyls and Dioxins							
Aroclor 1016***	12674-11-2	0.02	0.5	0.5	0.5	0.5	0.5
Aroclor 1248***	12672-29-6	0.02	0.5	0.5	0.5	0.5	0.5
Aroclor 1254***	11097-69-1	0.02	0.5	0.5	0.5	0.5	0.5
2,3,7,8-TCDD Toxic Equivalence (TEQ)	1746-01-6	0.0000002	0.00001	0.00001	0.00003	0.00003	0.00001
Pesticides							
4,4'-DDD	72-54-8	0.1	0.02	0.1	NA	NA	0.1
4,4'-DDE	72-55-9	0.1	0.01	0.1	NA	NA	0.1
4,4'-DDT	50-29-3	0.1	0.1	0.1	NA	NA	0.1
alpha-BHC	319-84-6	0.006	0.02	0.02	NA	NA	0.02
beta-BHC	319-85-7	0.02	0.04	0.04	NA	NA	0.04
Dieldrin	60-57-1	0.002	0.03	0.03	NA	NA	0.03
Endosulfan II	33213-65-9	40	0.04	40	NA	NA	40
Endosulfan sulfate	1031-07-8	40	0.02	40	NA	NA	40
gamma-BHC	58-89-9	0.03	0.02	0.03	0.2	0.2	0.03
gamma-Chlordane**	5103-74-2	0.01	0.5	0.5	2	0.5	0.5
Heptachlor	76-44-8	0.008	0.05	0.05	0.4	0.4	0.05
Heptachlor epoxide	1024-57-3	0.004	0.2	0.2	0.2	0.2	0.2
Methoxychlor	72-43-5	40	0.1	40	40	40	40
Inorganics							
Aluminum	7429-90-5	200	30	200	50-200	200	50
Arsenic	7440-38-2	0.02	3	3	10	5	3
Barium	7440-39-3	6,000	200	6,000	2,000	2,000	2,000
Cadmium	7440-43-9	4	0.5	4	5	5	4
Chromium	7440-47-3	70	1	70	100	100	70
Iron	7439-89-6	300	20	300	300	300	300
Lead	7439-92-1	5	5	5	15	NA	5
Manganese	7439-96-5	50	0.4	50	50	50	50

*'Modified' is defined as the higher of the Remediation Standard for Groundwater and PQL
**Standards for gamma-Chlordane come from "Total" Chlordane standard that includes alpha- and gamma-Chlordane
***Aroclor standards are for "PCBs (Polychlorinated biphenyls)" which include all PCB Aroclors

TABLE 8
ACTION-SPECIFIC ARARs
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Action	Title	Citation	Description	ARAR or TBC	Comments
			Federal		
Generation, Management, and Treatment of Hazardous Waste	Identification and Listing of Hazardous Wastes	40 CFR 261	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 40 CFR Parts 260 to 266.	ARAR	These regulations could apply for off-site disposal of contaminated groundwater or by-products of treatment.
	Hazardous Waste Determination	40 CFR 262.11	Generators must characterize their wastes to determine if the waste is hazardous by listing (40 CFR 261, Subpart D) by characteristic (40 CFR 261, Subpart C) or excluded from regulation (40 CFR 261.4)	ARAR	These regulations could apply for off-site disposal of contaminated groundwater or by-products of treatment.
	Manifesting	40 CFR 262, Subpart B	Generators must prepare a Hazardous Waste Manifest (EPA form 8700-22) for all off-site shipments of hazardous waste to disposal and/or treatment facilities.	ARAR	Would apply to all off-site shipments of hazardous waste.
	Recordkeeping	40 CFR 262.40	Generators must retain copies of all hazardous waste manifests used for off-site disposal.	ARAR	Generator must retain copies of waste manifests for a minimum period of three years after shipment date.
	Labeling and Marking	40 CFR 262 Subpart C	Specifies EPA marking, labeling and container requirements for off-site disposal of hazardous waste.	ARAR	Pre-transportation requirements for off-site shipments of hazardous wastes.
	Accumulation Limitations	40 CFR Part 262.34	Allows generators of hazardous waste to store and treat hazardous waste at the generation site for up to 90 days in tanks, containers, and containment buildings without having to obtain a RCRA hazardous waste permit.	ARAR	Hazardous waste may be stored for up to 90 days on-site without the need to meet storage permit substantive requirements.
	RCRA - Treatment, Storage and Disposal of Hazardous Waste	40 CFR 264/265	Specifies requirements for the operation of hazardous waste treatment, storage, and disposal facilities.	ARAR	Applicable for on-site hazardous waste treatment, storage, and disposal activities.
Transport of Hazardous Waste	USDOT Hazardous Materials Transportation Regulations	49 CFR 171-180	Established classification, packaging, and labeling requirements for shipments of hazardous materials.	ARAR	Applicable for the preparation of hazardous materials generated on-site for off-site shipment.
Air Emissions from a Point Source	National Ambient Air Quality Standards	40 CFR Part 50	Establishes ambient air quality standards for protection of public health.	ARAR	May be applicable in evaluating air impacts during remedial activities.
	New Source Review and Prevention of Significant Deterioration Requirements	40 CFR Part 52	New sources or modifications which emit greater than defined thresholds for listed pollutants must perform ambient impact analyses and install controls which meet best available control technology (BACT)	ARAR	Potentially applicable for certain remediation technologies and would require a comparison of potential emissions to the emission thresholds.
	National Emissions Standards for Hazardous Air Pollutants (NESHAP)	40 CFR Part 61; 40 CFR Part 63	Source-specific regulations which establish emissions standards for hazardous air pollutants	ARAR	Potentially applicable if emissions from remediation activities exceed thresholds for compliance.

TABLE 8
ACTION-SPECIFIC ARARs
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Action	Title	Citation	Description	ARAR or TBC	Comments
			Federal		
	New Source Performance Standards	40 CFR Part 6	Source-specific regulations which establish testing, control monitoring and reporting requirements for new emissions sources.	ARAR	NSPS could be relevant and appropriate if regulated new sources of air emissions were to be established on site.
Land Disposal of Hazardous Waste	RCRA Subtitle C Land Disposal Restrictions	40 CFR Section 6901 40 CFR Part 268	Restricts land disposal of hazardous wastes that exceed specific criteria. Establishes Universal Treatment Standards to which hazardous waste must be treated prior to disposal.	ARAR	Potentially applicable if hazardous residuals are generated from groundwater treatment.
Discharges to Surface Water	Clean Water Act Effluent Guidelines and Standards; National Pollutant Discharge Elimination System (NPDES) Program	40 CFR Part 401 and 40 CFR Parts 122-125	Both on- and off-site dishcarges from CERCLA sites to surface waters are required to meet the substantive Clean Water Act limitations, monitoring requirements, and best management practices. NPDES permits are required to discharge treated water to a surface water.	ARAR	Applicable for discharges of groundwater to surface water bodies.
			State of New Jersey		
Generation, Management, and Treatment of Hazardous Waste	Hazardous Waste Management Regulations	NJAC 7:26G	Requirements for the generation, accumulation, on-site management, and transportation of hazardous waste.	ARAR	Applicable for on-site management of hazardous waste.
	Treatment Works Approvals	NJAC 7:14A-22	Design and construction standards for wastewater treatment systems.	ARAR	Applicable for on-site treatment of groundwater.
Site Work	Soil Erosion and Sediment Control Act	NJSA 4:24	Requires the implementation of soil erosion and sediment control measures for activities disturbing over 5,000 square feet of land area.	ARAR	Applicable for site activities involving excavation, grading, or other soil disturbance activities.
Air Emissions from a Point Source	Air Quality Regulations	NJAC 7:27	Requirements applicable to air pollution sources.	ARAR	Applicable to the generation and emission of air pollutants.

TABLE 8
CHEMICAL-SPECIFIC ARARs
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Title	Citation	Description	ARAR or TBC	Comments
Federal				
Safe Drinking Water Act	40 CFR Part 141	Drinking water standards, expressed as maximum contaminant levels (MCLs), which apply to specific contaminants that have been determined to have an adverse impact on human health.	ARAR	Contaminant concentrations exceeding MCLs in drinking water may warrant corrective actions.
EPA Regional Screening Levels	http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_NOVEMBER2010.pdf	Provides concentrations for compounds and analytes based on their most recent risk assessment data.	TBC	May be used to screen contaminant concentrations to decide whether additional action is warranted.
State of New Jersey				
New Jersey Drinking Water Quality Act MCLs	NJAC 7:10-16	Rules that are promulgated to implement New Jersey's Safe Drinking Water Program. Standards are expressed as MCLs.	ARAR	Contaminant concentrations exceeding MCLs in drinking water may warrant corrective actions.
New Jersey Remediation Standards	NJAC 7:26D	Establishes minimum groundwater remediation standards. Numerical GWQS for Class IIA groundwater were established pursuant to NJAC 7:9C-1.7(c).	ARAR	Contaminant concentrations exceeding GWQS in groundwater may warrant corrective actions.
New Jersey Groundwater Quality Standards	NJAC 7:9C	The Ground Water Quality Standards (GWQS) establish the designated uses of the State's groundwaters, classify groundwaters based on those uses, and specify the water quality criteria to attain those designated uses. The ground water quality criteria are numerical values assigned to each constituent (pollutant) discharged to ground waters of the State. Ground water is classified according to its hydrogeologic characteristics and designated uses.	ARAR	Contaminant concentrations exceeding GWQS in groundwater may warrant corrective actions.

TABLE 8
LOCATION-SPECIFIC ARARs
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

Title	Citation	Description	ARAR or TBC	Comments
		Federal		
Executive Order 11988 - Floodplain Management	40 CFR 6, Subpart A; 40 CFR 6.302	Activities taking place within floodplains must be performed to avoid adverse impacts and preserve beneficial values	TBC	Pertinent to activities that may occur within the floodplain.
Executive Order 11990 - Protection of Wetlands	40 CFR 6, Subpart A	Activities performed within wetlands areas must be done to avoid adverse impacts	TBC	Would be applicable to remediation activities impacting jurisdictional wetlands.
Policy on Flooodplains and Wetlands Assessments for CERCLA Actions	OSWER 9280.0-02	Guidance for implementing executive orders 11988 and 11990.	TBC	Executive order implementation guidance.
Wetlands Protection at CERCLA site	OSWER 9280.0-03	Guidance document to be used to evaluate impacts to wetlands at Superfund sites	TBC	Requirements should be considered when evaluting impacts to jurisdictional wetlands.
National Historic Preservation Act	16 CFR 470	Established requirements for the identification and preservation of historic and cultural resources.	ARAR	Would be applicable to the management of historic or archaeological artifacts identified on the Site.
Endangered Species Act and Fish and Wildlife Coordination Act	16 CFR 661 and 16 U.S.C. 1531	Actions must be taken to conserve critical habitat in areas where there are endangered or threatened species.	ARAR	Requirements would be applicable if endangered or threatened species are identifed on or adjacent to the Site.
Resource Conservation and Recovery Act (RCRA) Regulations - Location Standards	40 CFR 264.18	Regulates the design, construction, operation and maintenance of hazardous waste management facilities within the 100-year floodplain.	ARAR	Applicable for on-site treatment, storage or disposal of hazardous waste.
		State of New Jersey		
Flood Hazard Area Regulations	NJAC 7:13	Regulates the placement of fill, grading, excavation and other disturbances within the defined flood hazard area/floodplain of rivers/streams.	ARAR	Applicable for Site activities occurring within the flood hazard area or floodplain of on-site rivers/streams.
Freshwater Wetlands Protection Act Rules	NJAC 7:7A	Regulates the disturbance or alteration of freshwater wetlands and their respective buffers.	ARAR	Applicable for Site activities disturbing freshwater wetlands and buffer areas.

TABLE 9
Cost Estimate for Alternative 2

Alternative 2
Monitoring with Institutional Controls

OPINION OF PROBABLE COST

Site: Cornell-Dubilier Electronics Superfund Site
Location: South Plainfield, New Jersey
Phase: Feasibility Study (-30% to +50%)
Base Year: 2012
Date: April 2012

Description: Alternative 2 consists of institutional controls and groundwater monitoring using the existing well network with 4 additional wells to be installed. Capital costs are incurred in Year 1. O&M costs are incurred in Years 2-30.

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES:
Monitoring Well Installation (1)	4	each	$80,000	$320,000	
FLUTe Liner Installation (2)	4	each	$100,000	$400,000	
Eng Support for Driller, Geophysics, and Liner Installation (3)	600	hour	$110	$66,000	
Long-Term Monitoring Work Plan (4)	1	lump sum	$150,000	$150,000	
Institutional Controls (5)	1	lump sum	$50,000	$50,000	
SUBTOTAL				$986,000	
Scope and Bid Contingency (9)	15%			$147,900	
Design/Project Management	20%			$197,200	
Construction Oversight	20%			$197,200	
SUBTOTAL				$543,000	
TOTAL CAPITAL COST				**$1,529,000**	

OPERATION, MAINTENANCE, AND MONITORING (OM&M) COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES:
Annual Costs, Years 1-2 (quarterly monitoring)					
Analytical Laboratory (6)	1	lump sum	$241,100	$241,100	
Data Validation (10% of analytical cost)	1	lump sum	$24,110	$24,110	
Field Equipment and Cooler Shipping (7)	4	per event	$20,000	$80,000	
Sample Collection Labor (four events) (8)	1,200	hour	$110	$132,000	
IDW Disposal	60	drum	$500	$30,000	
Annual Monitoring Well Maintenance	1	lump sum	$5,000	$5,000	
Reports (10)	4	each	$30,000	$120,000	
SUBTOTAL				$632,210	
Project Management	10%			$63,221	
Engineering and Technical Support (9)	10%			$63,221	
SUBTOTAL				$759,000	
Annual Costs, Years 3-5 (semi-annual monitoring)					
Analytical Laboratory (6)	1	lump sum	$170,900	$170,900	
Data Validation (10% of analytical cost)	1	lump sum	$17,090	$17,090	
Field Equipment and Cooler Shipping (7)	2	per event	$20,000	$40,000	
Sample Collection Labor (four events) (8)	600	hour	$110	$66,000	
IDW Disposal	30	drum	$500	$15,000	
Annual Monitoring Well Maintenance	1	lump sum	$5,000	$5,000	
Reports	2	each	$30,000	$60,000	
SUBTOTAL				$373,990	
Project Management	10%			$37,399	
Engineering and Technical Support (9)	10%			$37,399	
SUBTOTAL				$449,000	

TABLE 9
Cost Estimate for Alternative 2

Alternative 2
Monitoring with Institutional Controls

OPINION OF PROBABLE COST

Annual Costs, Years 6-15 (annual monitoring)				
Analytical Laboratory (6)	1	lump sum	$115,100	$115,100
Data Validation (10% of analytical cost)	1	lump sum	$11,510	$11,510
Field Equipment and Cooler Shipping (7)	1	per event	$20,000	$20,000
Sample Collection Labor (four events) (8)	300	hour	$110	$33,000
IDW Disposal	15	drum	$500	$7,500
Annual Monitoring Well Maintenance	1	lump sum	$5,000	$5,000
Reports	1	each	$30,000	$30,000
SUBTOTAL				$222,110
Project Management	10%			$22,211
Engineering and Technical Support (9)	10%			$22,211
SUBTOTAL				$267,000
Annual Costs, Years 16-30 (monitoring once every two years)				
Analytical Laboratory (6)	1	lump sum	$57,600	$57,600
Data Validation (10% of analytical cost)	1	lump sum	$5,760	$5,760
Field Equipment and Cooler Shipping (7)	1	per event	$20,000	$10,000
Sample Collection Labor (four events) (8)	150	hour	$110	$16,500
IDW Disposal	8	drum	$500	$4,000
Annual Monitoring Well Maintenance	1	lump sum	$5,000	$5,000
Reports	1	each	$30,000	$15,000
SUBTOTAL				$113,860
Project Management	10%			$11,386
Engineering and Technical Support (9)	10%			$11,386
SUBTOTAL				$137,000

PRESENT VALUE ANALYSIS (30 Years):

COST TYPE	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR OF 7% (9)	PRESENT VALUE	NOTES:
Capital	$1,529,000	$1,529,000	1.00	$1,529,000	
Annual OM&M, Years 1-2	$1,518,000	$759,000	1.81	$1,373,800	
Annual OM&M, Years 3-5	$1,347,000	$449,000	2.29	$1,028,300	
Annual OM&M, Years 6-15	$2,670,000	$267,000	5.01	$1,337,700	
Annual OM&M, Years 16-30	$2,055,000	$137,000	3.30	$452,100	
TOTAL PRESENT VALUE OF ALTERNATIVE 2 (30 Years)				**$5,720,900**	
TOTAL NON-DISCOUNTED WORTH OF MONITORING (30 Years)				***$9,119,000***	

Footnotes

1 Assume four additional monitoring wells drilled to an average depth of 500 feet using rotary air drill rig. Includes driller, standby time, casing, and completion. Includes IDW disposal.
2 Installation of four FLUTe liners, each with 9 sampling ports. Includes geophysical work.
3 Oversight during monitoring well drilling (4 week duration) and geophysics (2 week) liner installation (2 week duration). Preparation of logs. boring logs and well logs.
4 Long-term monitoring work plan preparation.
5 Assume that the primary institutional control is a New Jersey groundwater classification exception area.
6 Please see attached backup sheet (Attachment 2) showing the frequency of analyte analysis for each monitoring location.
7 Includes tubing, pumps, decon equipment, flow-through water quality meters. Also includes overnight shipping of coolers.
8 Assume a crew of 3 people and a duration of 9 field days for sample collection. Assume that 2 people spend 2 days doing mob/demob.
9 In accordance with EPA Guide to Developing and Documenting Cost Estimates During the Feasibility Study (EPA 540-R-00-002)
10 Assume that long-term monitoring reporting is adequate for CERCLA 5-year reviews.

Legend

Property Boundary

Bound Brook

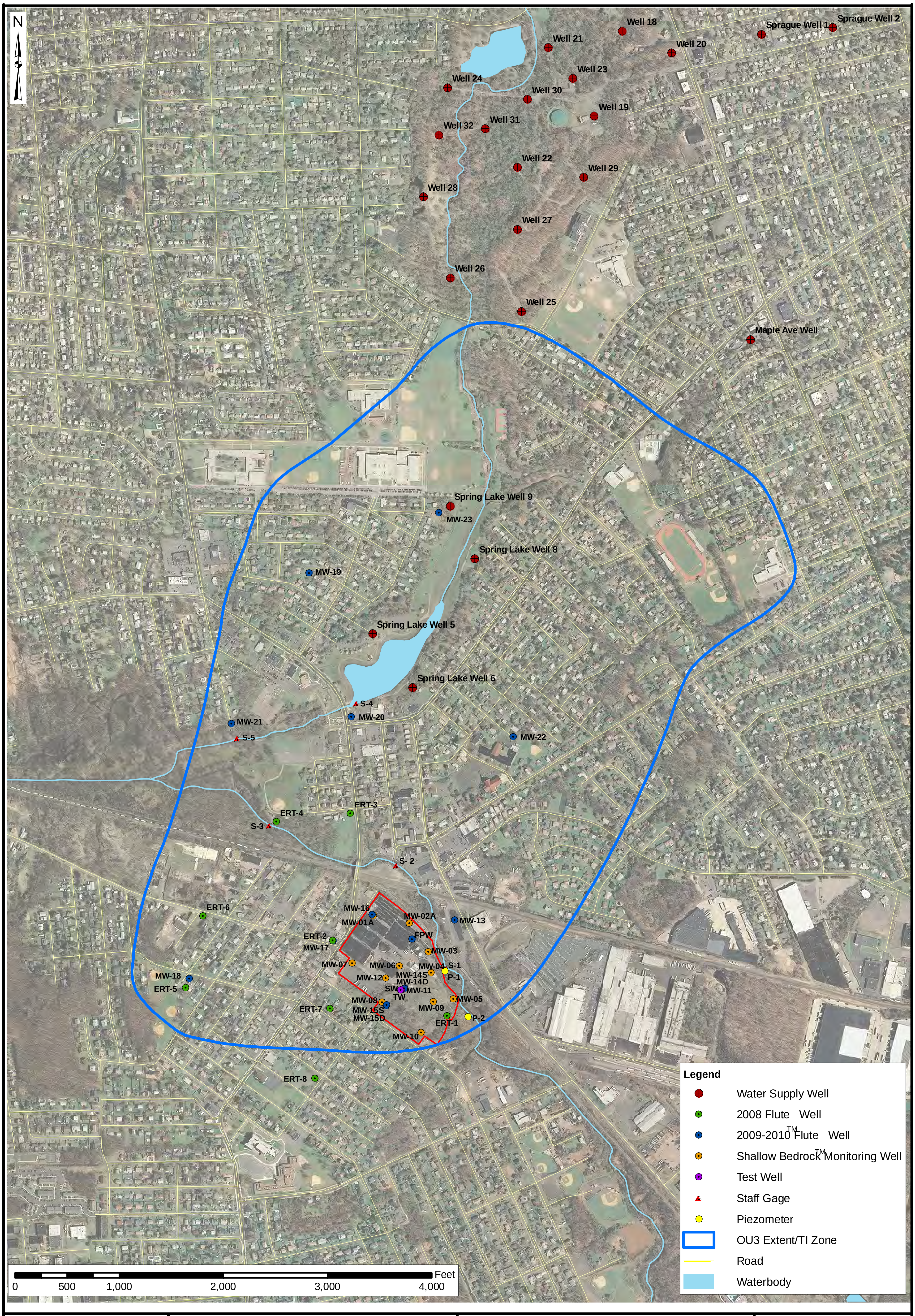
0 250 500 1,000

Feet

Source: New Jersey Geographic Information Network
(NJ 2007 Orthoimagery)

ARCADIS MALCOLM PIRNIE	Cornell-Dubilier Electronics Superfund Site South Plainfield, New Jersey	FORMER CDE FACILITY OPERABLE UNIT 2	FIGURE 1

R2-0023012



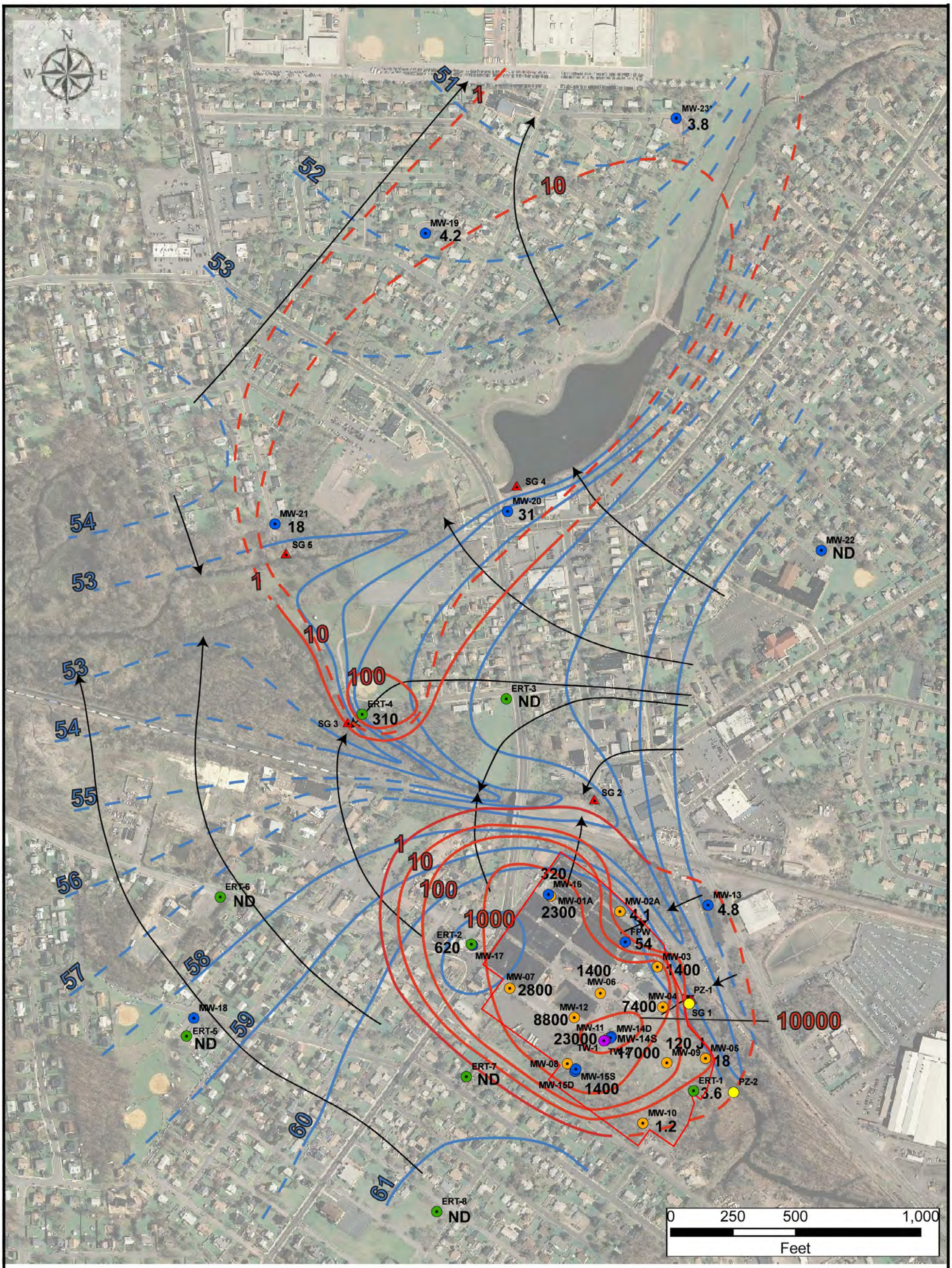
ARCADIS MALCOLM PIRNIE

Cornell-Dubilier Electronics Superfund Site

South Plainfield, New Jersey

APPROXIMATE AERIAL EXTENT OF OU3 INVESTIGATION

Figure 2



Legend

Former CDE Facility	2008 Flute™ Well	Test Well
Shallow Bedrock Monitoring Well	2009 Flute™ Well	Staff Gage
Piezometer	Direction of Groundwater Movement	

MCL 1 — Line of Equal TCE Concentration (ug/L) (dashed where inferred)

3.6 — Aqueous TCE Concentration (ug/L)

61 — Line of Equal Groundwater Elevation (ft msl) (dashed where inferred)

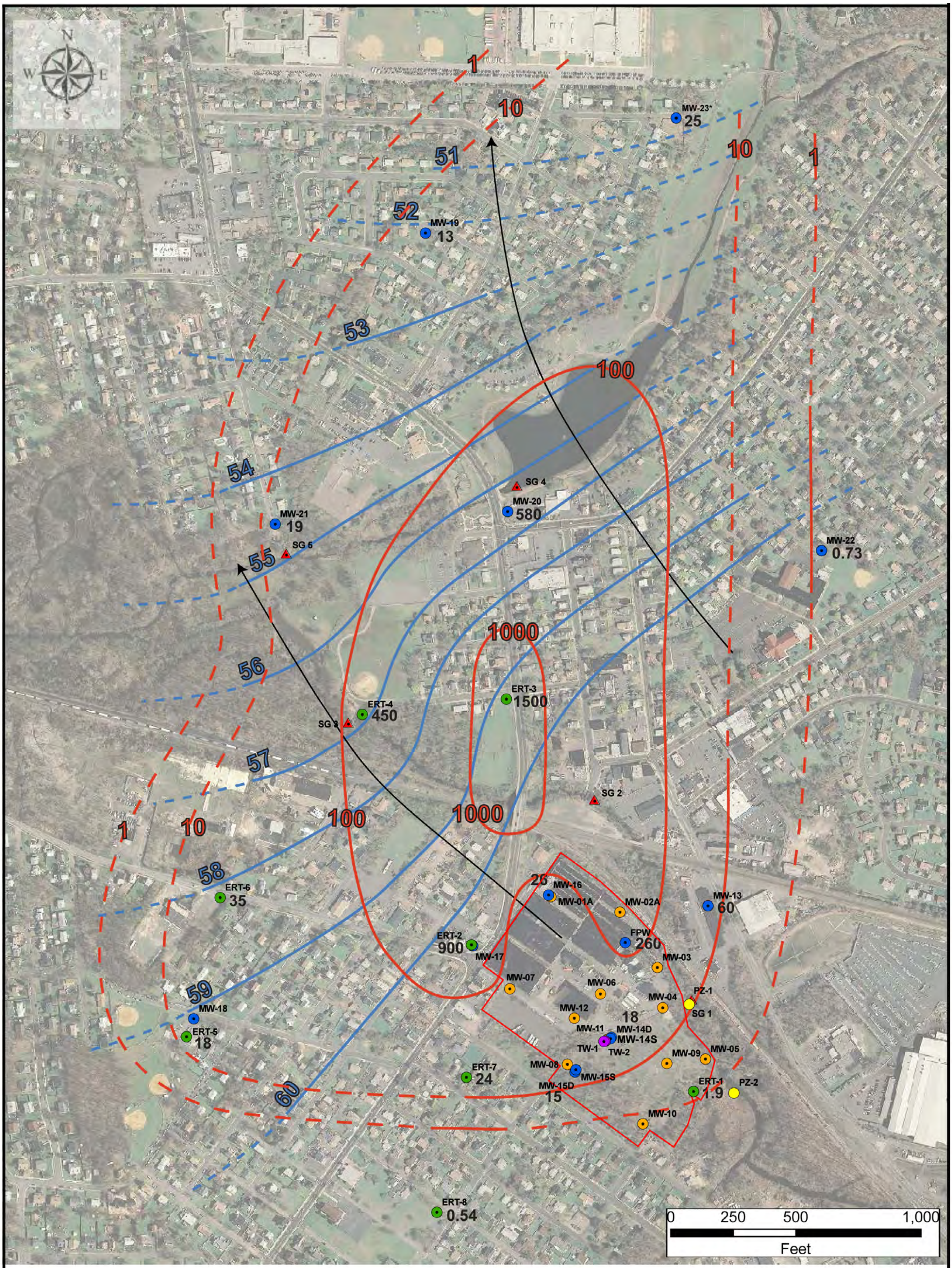
*Note: MW-23 installed and sampled in December 2010, March 2011

ARCADIS MALCOLM PIRNIE
Infrastructure · Water · Environment · Buildings

Cornell-Dubilier Electronics Superfund Site - OU3
South Plainfield, New Jersey

Potentiometric Surface of Shallow (0' - 120' bgs) Water Bearing Zone
July 9, 2010
Aqueous Concentration of TCE
March 2010

Figure 3



Legend

MCL — 1 — Line of Equal TCE Concentration (ug/L) (dashed where inferred)

Former CDE Facility

2008 Flute™ Well

Test Well

Piezometer

3.6 Aqueous TCE Concentration (ug/L)

Shallow Bedrock Monitoring Well

2009 Flute™ Well

Staff Gage

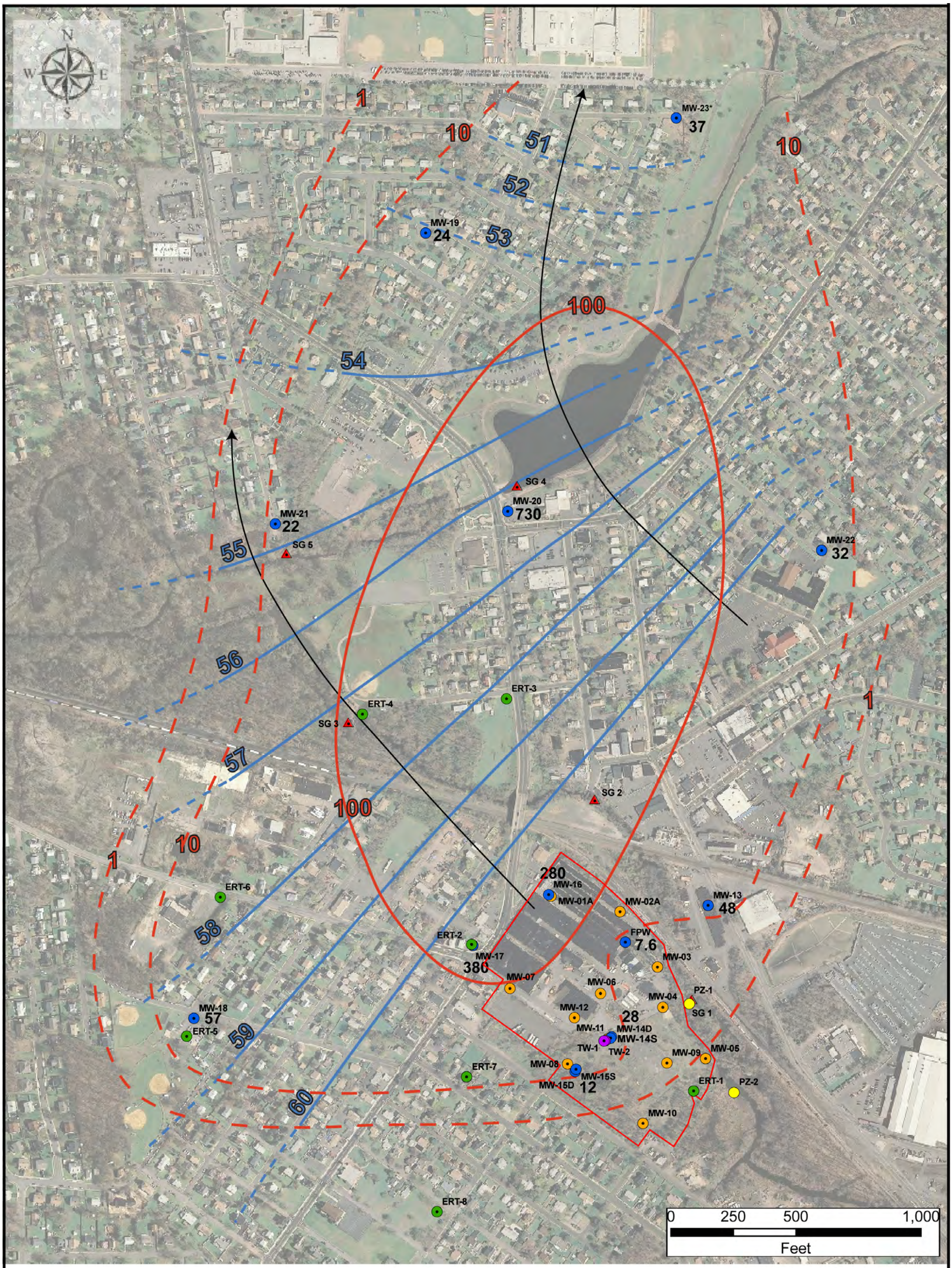
Direction of Groundwater Movement

61 Line of Equal Groundwater Elevation (ft msl) (dashed where inferred)

*Note: MW-23 installed and sampled in December 2010, March 2011

ARCADIS MALCOLM PIRNIE Infrastructure · Water · Environment · Buildings	Cornell-Dubilier Electronics Superfund Site - OU3 South Plainfield, New Jersey	**Potentiometric Surface of Intermediate (120'-160' bgs) Water Bearing Zone July 9, 2010** **Aqueous Concentration of TCE March 2010**	FIGURE 4

R2-0023015



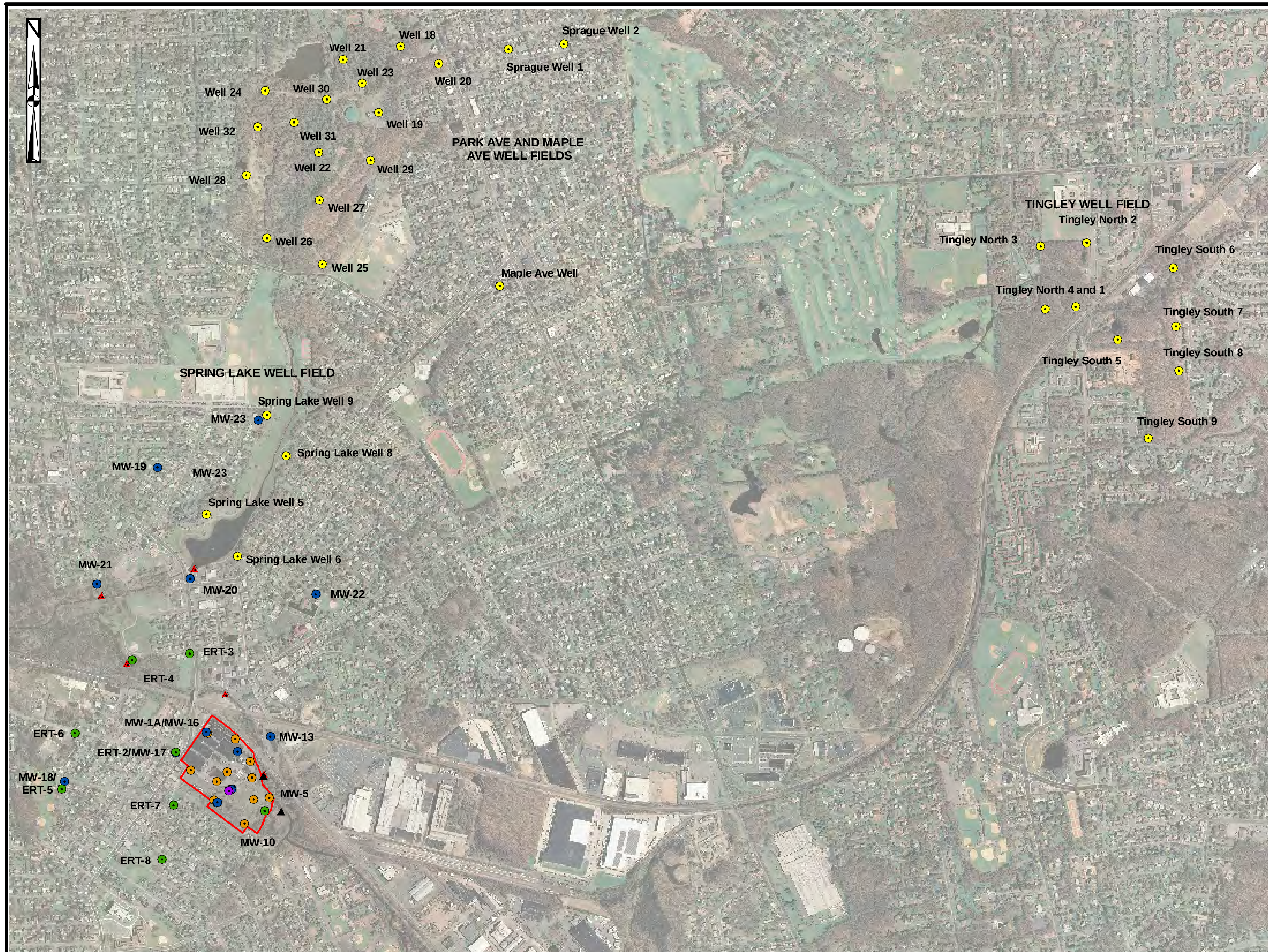
Legend

- Former CDE Facility
- Shallow Bedrock Monitoring Well
- 2008 Flute™ Well
- 2009 Flute™ Well
- Test Well
- Staff Gage
- Piezometer
- Direction of Groundwater Movement
- MCL — 1 — Line of Equal TCE Concentration (ug/L) (dashed where inferred)
- 3.6 Aqueous TCE Concentration (ug/L)
- 61 Line of Equal Groundwater Elevation (ft msl) (dashed where inferred)

*Note: MW-23 installed and sampled in December 2010, March 2011

ARCADIS MALCOLM PIRNIE Infrastructure · Water · Environment · Buildings	Cornell-Dubilier Electronics Superfund Site - OU3 South Plainfield, New Jersey	**Potentiometric Surface of Deep (200' - 240' bgs) Water Bearing Zone** **July 9, 2010** **Aqueous Concentration of TCE** **March 2010**	FIGURE 5

R2-0023016



Legend

Former CDE Facility

2008 Flute™ Well

2009-2010 Flute™ Well

Shallow Bedrock Monitoring Well

Test Well

Staff Gage

Piezometer

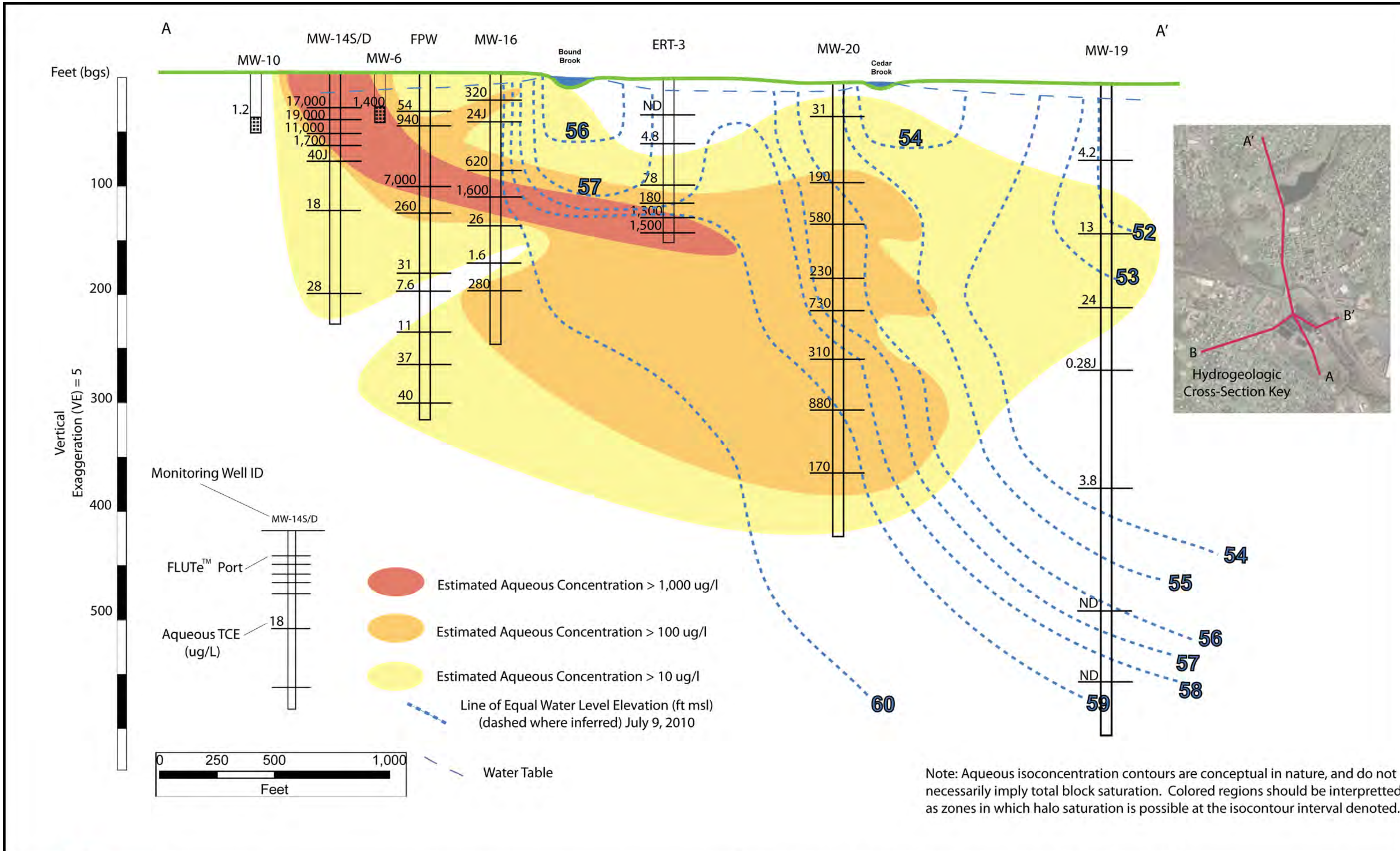
Pumping Wells (Active and Inactive)

0 1,250 2,500 5,000
Feet

Map Document: G:\project\4553058\GIS\Mxds\All_Well_Locations_Wellfields1.mxd) 5/31/2012 -- 9:57:06 AM

ARCADIS MALCOLM PIRNIE	Cornell-Dubilier Electronics Superfund Site South Plainfield, New Jersey	Surrounding Wellfield Locations	FIGURE 6

R2-0023017

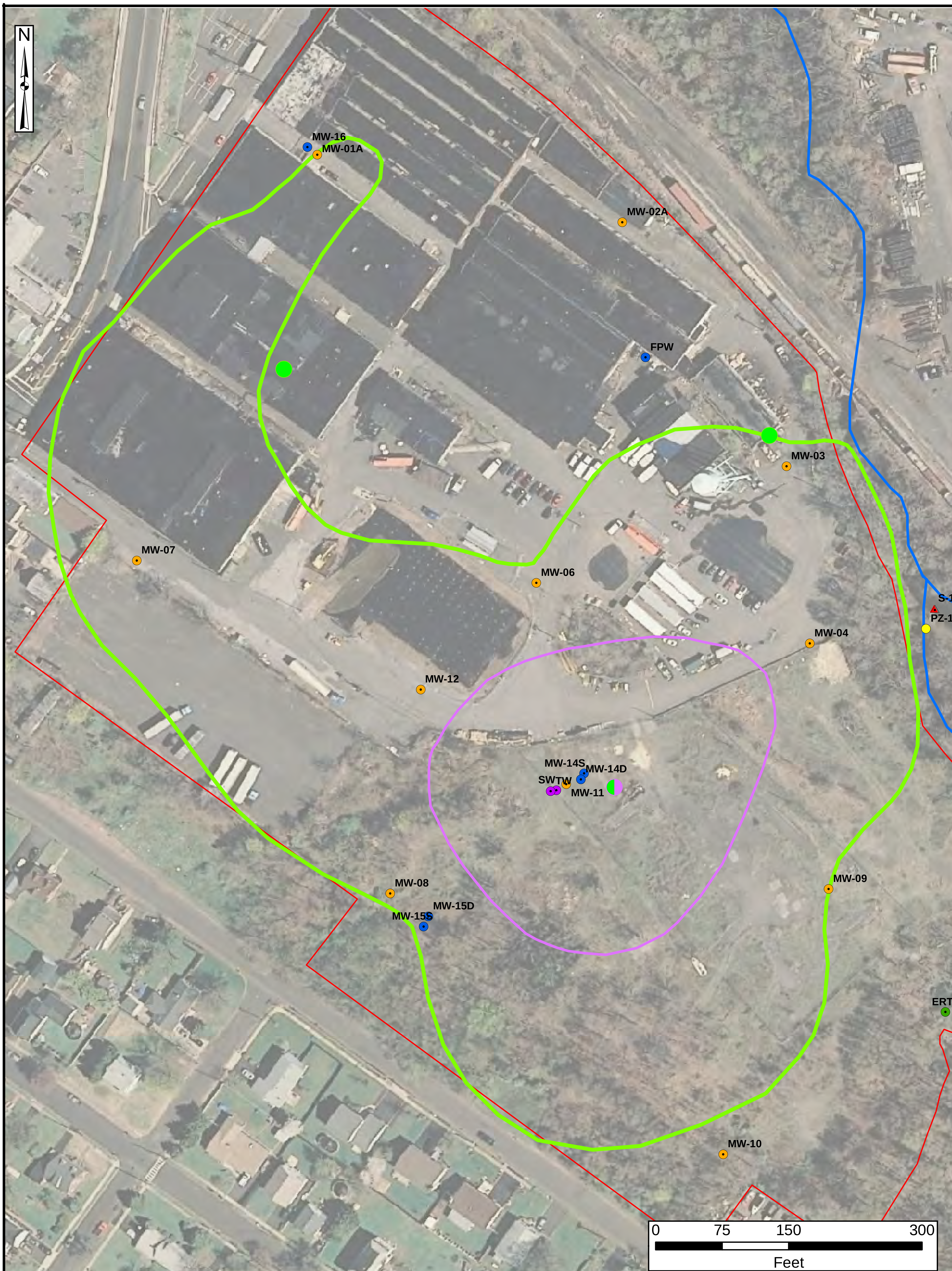


ARCADIS MALCOLM PIRNIE

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE - OU3 GROUNDWATER
South Plainfield, New Jersey

HYDROGEOLOGIC CROSS SECTION (N-S) July 9, 2010
with AQUEOUS CONCENTRATION
ISOCONTOURS - TRICHLOROETHENE (TCE)

FIGURE 7



Legend

*Based on March 2010 Analytical Data

(red outline)	Former CDE Facility	(green/pink circle)	Alternatives 3A/3B Extraction Well	(blue dot)	2009-2010 FLUTe™ Well	(red triangle)	Staff Gage
(pink outline)	Alternative 3A - 25,000 ug/L TVOC*	(green circle)	Alternative 3B Extraction Well	(orange dot)	Shallow Bedrock Monitoring Well	(yellow dot)	Piezometer
(green outline)	Alternative 3B - 2,500 ug/L TVOC*	(dark green dot)	2008 FLUTe™ Well	(purple dot)	Test Well	(blue line)	Bound Brook

ARCADIS MALCOLM PIRNIE	Cornell-Dubilier Electronics Superfund Site South Plainfield, New Jersey	APPROXIMATE TREATMENT AREAS FOR ALTERNATIVES 3 AND 4	Figure 8

Map Document: G:\project\4553058\GIS\Mxds\PlumeContours_TreatArea3A3B.mxd)
4/30/2012 -- 12:05:00 PM

APPENDIX II
Administrative Record Index

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

08/23/2012 **Region ID: 02**

Site Name: CORNELL DUBILIER ELECTRONICS INC.
CERCLIS: NJD981557879
OUID: 03
SSID: 02GZ
Action:

Region ID: 02
Doc ID: 124200
Bates: **To:**
Date: 08/23/2012
Pages: 7
Title: ADMINISTRATIVE RECORD INDEX FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: INDEX

	Name	Organization
Author:	,	US ENVIRONMENTAL PROTECTION AGENCY

Name	Organization

Related Document(s):

Region ID: 02
Doc ID: 124196
Bates: R2-0000001 **To:** R2-0000300
Date: 10/28/2008
Pages: 300
Title: FINAL SITE-WIDE SITE SAFETY AND HEALTH PLAN FOR ALL OPERABLE UNITS (OU1 THROUGH OU-4) FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: PLAN

	Name	Organization
Author:	,	MALCOLM PIRNIE, INC.

Name	Organization

Related Document(s):

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

08/23/2012 **Region ID: 02**

Site Name: CORNELL DUBILIER ELECTRONICS INC.
CERCLIS: NJD981557879
OUID: 03
SSID: 02GZ
Action:

Region ID: 02
Doc ID: 124197
Bates: R2-0000301 **To:** R2-0000407
Date: 12/01/2008
Pages: 107
Title: FINAL REMEDIAL INVESTIGATION / FEASIBILITY STUDY WORK PLAN FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: PLAN

	Name	Organization
Author:	,	MALCOLM PIRNIE, INC.
	Name	**Organization**

Related Document(s):

Region ID: 02
Doc ID: 124195
Bates: R2-0000408 **To:** R2-0001088
Date: 12/17/2008
Pages: 681
Title: QUALITY ASSURANCE PROJECT PLAN FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: PLAN

	Name	Organization
Author:	,	MALCOLM PIRNIE, INC.
	Name	**Organization**

Related Document(s):

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

08/23/2012 **Region ID: 02**

Site Name: CORNELL DUBILIER ELECTRONICS INC.
CERCLIS: NJD981557879
OUID: 03
SSID: 02GZ
Action:

Region ID: 02
Doc ID: 124193
Bates: R2-0001089 **To:** R2-0001451
Date: 06/29/2012
Pages: 363
Title: FINAL FEASIBILITY STUDY REPORT FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: REPORT

	Name	Organization
Author:	,	THE LOUIS BERGER GROUP, INC.
	,	ARCADIS/MALCOLM PIRNIE

Name	Organization

Related Document(s):

Region ID: 02
Doc ID: 124194
Bates: R2-0001452 **To:** R2-0001561
Date: 06/29/2012
Pages: 110
Title: FINAL TECHNICAL IMPRACTICABILITY EVALUATION FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: REPORT

	Name	Organization
Author:	,	ARCADIS/MALCOLM PIRNIE
	,	THE LOUIS BERGER GROUP, INC.

Name	Organization

Related Document(s):

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

08/23/2012 **Region ID: 02**

Site Name: CORNELL DUBILIER ELECTRONICS INC.
CERCLIS: NJD981557879
OUID: 03
SSID: 02GZ
Action:

Region ID: 02
Doc ID: 124192
Bates: R2-0001562 **To:** R2-0002051
Date: 06/29/2012
Pages: 490
Title: FINAL BASELINE HUMAN HEALTH RISK ASSESSMENT FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: REPORT

	Name	Organization
Author:	,	ARCADIS/MALCOLM PIRNIE
	,	THE LOUIS BERGER GROUP, INC.
	Name	**Organization**

Related Document(s):

Region ID: 02
Doc ID: 124198
Bates: R2-0002052 **To:** R2-0002748
Date: 06/29/2012
Pages: 697
Title: FINAL REMEDIAL INVESTIGATION REPORT FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: REPORT

	Name	Organization
Author:	,	THE LOUIS BERGER GROUP, INC.
	,	ARCADIS/MALCOLM PIRNIE
	Name	**Organization**

Related Document(s):

Site Name: CORNELL DUBILIER ELECTRONICS INC.
CERCLIS: NJD981557879
OUID: 03
SSID: 02GZ
Action:

Region ID: 02
Doc ID: 124201
Bates: R2-0002749 **To:** R2-0016480
Date: 06/29/2012
Pages: 13732
Title: APPENDIX A: US EPA SUPERFUND SUPPORT TEAM SAMPLING REPORT TO THE FINAL REMEDIAL INVESTIGATION REPORT FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: REPORT

	Name	Organization
Author:	,	THE LOUIS BERGER GROUP, INC.
	,	ARCADIS/MALCOLM PIRNIE

Name	Organization

Related Document(s):

Region ID: 02
Doc ID: 124202
Bates: R2-0016481 **To:** R2-0017304
Date: 06/29/2012
Pages: 824
Title: APPENDIX B THROUGH APPENDIX F TO THE FINAL REMEDIAL INVESTIGATION REPORT FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: REPORT

	Name	Organization
Author:	,	ARCADIS/MALCOLM PIRNIE
	,	THE LOUIS BERGER GROUP, INC.

Name	Organization

Related Document(s):

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

08/23/2012 **Region ID: 02**

Site Name: CORNELL DUBILIER ELECTRONICS INC.
CERCLIS: NJD981557879
OUID: 03
SSID: 02GZ
Action:

Region ID: 02
Doc ID: 124203
Bates: R2-0017305 **To:** R2-0022666
Date: 06/29/2012
Pages: 5362
Title: APPENDIX G THROUGH APPENDIX U TO THE FINAL REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: REPORT

	Name	Organization
Author:	,	ARCADIS/MALCOLM PIRNIE
	,	THE LOUIS BERGER GROUP, INC.
	Name	**Organization**

Related Document(s):

Region ID: 02
Doc ID: 662060
Bates: R2-0022667 **To:** R2-0022695
Date: 07/19/2012
Pages: 29
Title: PROPOSED PLAN FOR OU3 - GROUNDWATER FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: PLAN

	Name	Organization
Author:	,	US ENVIRONMENTAL PROTECTION AGENCY
	Name	**Organization**

Related Document(s):

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

08/23/2012 **Region ID: 02**

Site Name: CORNELL DUBILIER ELECTRONICS INC.
CERCLIS: NJD981557879
OUID: 03
SSID: 02GZ
Action:

Region ID: 02
Doc ID: 141554
Bates: R2-0022696 **To:** R2-0022727
Date: 08/23/2012
Pages: 32
Title: ATTACHMENTS TO THE FINAL CDE OU3 TIER APPENDIX A AND FS APPENDIX B FOR THE CORNELL DUBILIER ELECTRONICS INCORPORATED SITE
Doc Type: MEMORANDUM

	Name	Organization
Author:	,	THE LOUIS BERGER GROUP, INC.

	Name	Organization
Addressee:	GARCIA, DIEGO	EPA
	MAAS, KEN	US ARMY CORPS OF ENGINEERS - KANSAS CITY DISTRICT

Related Document(s):

APPENDIX III
State Letter

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SITE REMEDIATION PROGRAM
Mail Code 401-06
P. O. Box 420
Trenton, New Jersey 08625-0420
Tel. #: 609-292-1250
Fax. #: 609-777-1914

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

SEP 26 2012

Mr. Walter Mugdan, Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
Region II
290 Broadway
New York, NY 10007-1866

Re: Cornell-Dublier Electronics, Inc. Superfund Site
Record of Decision

Dear Mr. Mugdan:

The New Jersey Department of Environmental Protection (DEP) completed its review of the "Operable Unit 3 Groundwater, Cornell-Dubilier Electronics, Inc. Site, South Plainfield Borough, Middlesex County, New Jersey" prepared by the U.S. Environmental Protection Agency (EPA) Region II in September 2012 and concurs with the selected remedy to address contamination in groundwater at the site with exception of the most highly contaminated portion predominantly associated with the source area on-site. DEP feels that addressing the source area by treatment and/or containment can only be beneficial and appreciates EPA plans to further address this area of the site. Specific recommendations have been forwarded to your staff for consideration.

The selected remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based on the Administrative Record file for this site. The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

The response action described in this document represents Operable Unit 3 (OU3) and addresses groundwater. It is considered a final action for portions of the site with the exception of addressing the most highly contaminated groundwater in the vicinity of the former CDE facility, referred to as Operable Unit 2 (OU2). EPA is deferring a final decision for this portion of groundwater. EPA plans to collect additional information regarding the potential benefits of treatment or containment for this portion of groundwater and further evaluate remedial alternatives as part of the decision-making for the Bound Brook study area, Operable Unit 4 (OU4) of the site.

The components of the Selected Remedy include:

• Implementation of a long-term sampling and analysis program to monitor groundwater contamination at the site in order to prevent exposure and assess groundwater migration;

• Implementation of a long-term vapor intrusion monitoring program; and,

• Prevent use of private drinking water wells in the vicinity of the OU3 study area, including by continuing efforts to identify existing private wells and by placing institutional controls in the form of a Classification Exception Area to prevent exposure through installation of new drinking water wells.

EPA evaluated alternatives for restoration of groundwater to meet Applicable or Relevant and Appropriate Requirements (ARARs) and concluded that no practicable alternatives could be implemented. Consequently, EPA is invoking an ARAR waiver for groundwater at the site due to technical impracticability.

DEP appreciates the opportunity to participate in the decision making process to select an appropriate remedy and is looking forward to future cooperation with EPA in further remedial work at this site.

If you have any questions, please call me at 609-292-1250.

Sincerely,

Dave Sweeney
Assistant Commissioner
Site Remediation Program

C: Ed Putnam, Assistant Director, Site Remediation Program, DEP
Ken Kloo, Director, Site Remediation Program, DEP
Carole Petersen, Chief, New Jersey Remediation Branch, EPA Region II

APPENDIX IV
Responsiveness Summary

APPENDIX IV
RESPONSIVENESS SUMMARY
Cornell-Dubilier Electronics Superfund Site
South Plainfield, New Jersey

INTRODUCTION

This Responsiveness Summary provides a summary of the public's comments and concerns regarding the Proposed Plan for the Cornell-Dubilier Electronics (CDE) site, and EPA's responses to those comments. All comments summarized in this document have been considered in EPA's final decision for the selection of the remedy for the site.

This Responsiveness Summary is divided into the following sections:

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS
This section provides the history of community involvement and interests regarding the site; and

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES

This section contains summaries of oral and written comments received by EPA at the public meeting and during the public comment period, and EPA's responses to these comments.
The last section of this Responsiveness Summary includes attachments, which document public participation in the remedy selection process for this site. They are as follows:

Attachment A contains the Proposed Plan that was distributed to the public for review and comments;
Attachment B contains the public notices that appeared in a prominent local newspaper, *The South Plainfield Observer*;
Attachment C contains the transcripts of the public meeting; and
Attachment D contains the public comments received during the public comment period.

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Since the placement of the site on the National Priorities List (NPL) in 1998, public interest in the site has been high.

On July 20, 2012, EPA released the Proposed Plan and supporting documentation for this action, the remedy for groundwater portions of the site referred to as Operable Unit 3 (OU3), to the public for comment. EPA made these documents available to the public in the administrative record repositories maintained at the EPA Region 2 office (located at 290 Broadway, New York, New York), and the South Plainfield Public Library, 2484 Plainfield Avenue, South Plainfield, New Jersey, and made a smaller group of documents available online (http://www.epa.gov/region02/superfund/npl/cornell/). EPA published a notice of availability for these documents in *The South Plainfield Observer*, and opened a public comment period from July 20, 2012 to August 20, 2012. Originally scheduled for 30 days, the comment period was extended to 60 days at the request of a member of the public, ending on September 20, 2012.

A public meeting was held on August 7, 2012, at the South Plainfield Senior Center, 90 Maple Avenue, South Plainfield, New Jersey. The purpose of this meeting was to inform local officials and interested citizens about the Superfund process, to discuss the Proposed Plan and receive comments on the Proposed Plan, and to respond to questions from area residents and other interested parties.

EPA received written and oral comments (including email communications) from 23 individuals or parties, including several hours of oral comments at the public meeting.

II.a. Written Comments

PART 1. Overview

Preference for a Substantial Cleanup Effort
The written and oral comments included several strong expressions of the idea that, irrespective of whatever technical limitations that might exist, EPA should be cleaning up the aquifer entirely.

> Response: These comments capture a view expressed by a number of commenters. EPA states in the Proposed Plan that the extensive studies undertaken establish that, given the nature and extent of the contamination, it is beyond the technical capacity of any available treatment method to restore the

aquifer within a reasonable time frame. The background to this conclusion is well-documented in the ROD; the commenters do not accept EPA's conclusion. There are a limited number of technical comments that challenge aspects of EPA's studies and findings, and those comments are addressed in this Responsiveness Summary. None of the technical comments have caused the Agency to change its conclusions about the groundwater conditions at this site. Several commenters expressed the perception that the level of effort by the Agency in conducting the groundwater investigations was somehow inadequate or incomplete. EPA strongly disagrees with this characterization – this was a highly sophisticated investigation of a complex set of site conditions, which included some of the foremost experts in the field of hydrogeology.

Call for an Interim Action Associated with the Spring Lake Wellfield

A group of environmental nonprofit groups, through their engineering consultant, recommended that EPA suspend the selection of a remedy for the groundwater at OU3 and instead implement the following program: utilize the existing Spring Lake wells to recover contaminated groundwater to prevent further discharge to the Bound Brook, until the Bound Brook study is complete. At that time, EPA can prepare to implement an effective permanent remedy that will remove the source areas and eventually eliminate the groundwater contamination over a short term period.

Response: EPA has deferred selection of a remedy to address the groundwater that may be adversely affecting the Bound Brook until the OU4 remedy. The comment assumes (a) that there is currently a release and (b) that it poses an unacceptable risk. One or both of these assumptions may be correct, but the Agency has no basis for taking an action until completion of the OU4 RI and risk assessments.

As to using the Spring Lake wells, please refer to the discussion on Page 33 of the Decision Summary, and response to Comment 2.1.12.

PART 2. Detailed Questions, Comments and Concerns

Subpart 1. Questions and Comments on the RI/FS, Site Studies, and the Proposed Plan Document.

1.1 Extending the Public Comment Period

1.1.1: Several commenters asked that EPA extend the comment period. In requesting the extension, the most common concern cited was the large volume of technical information available for review, concerns that "this groundwater is not fully defined," and uncertainties about the extent of groundwater to surface water contamination in the Bound Brook.

Response: The comment period was extended 30 days, to September 20, 2012. EPA had two requests for information during the comment period, one from Edison Wetlands Association for information about the operation of the Spring Lake wellfield, and one from a consultant who works with Edison Wetlands Association for several published scientific papers related to matrix diffusion. The Spring Lake information was in the Administrative Record. The scientific papers were provided electronically and added to the administrative record.

1.1.2: Several commenters noted in particular the uncertainties regarding the Bound Brook and recommended that, in order to have the most effective and efficient cleanup plan, this extent of contamination should be determined prior to selecting an appropriate remedy for OU3.

Response: EPA agrees that additional information about groundwater discharge to Bound Brook would be useful in understanding the conditions (and potential exposures) in the local groundwater near the Brook, and has deferred a final remedial decision for this part of the groundwater. There is no evidence that this local groundwater-to-surface water issue changes EPA's findings about the aquifer as a whole; hence the decision to still move forward with selecting Alternative 2 as the remedy for the aquifer.

1.2 Human Health Risk Assessment, RI/FS, and Scope of Site Investigations

1.2.1: One commenter asked that EPA extend the comment period until additional vapor intrusion tests are performed.

Response: EPA agrees that additional vapor intrusion testing is warranted as a prudent, long-term monitoring strategy; however, the vapor intrusion testing performed as part of the RI indicated that vapor intrusion is not a complete exposure pathway within the study area. As such, there is no basis to extend the comment period and the remedy selection process. Furthermore, vapor intrusion investigations can continue if necessary, regardless of the release of this ROD.

1.2.2: A commenter stated that the fact that public water supply wells were "pulling the contaminants towards them," and have been doing so "since day one" provides evidence conflicting with EPA's conclusion that the groundwater contamination is irretrievably bound to the rock formation.

Response: As discussed in the RI, public water supply wells have been withdrawing water from this aquifer since the early 20^{th} century, and the data suggest that this withdrawal has pulled the groundwater contamination further away from the CDE site than might have been expected without public water supply pumping. As described in the RI and in the Technical Impracticability Evaluation Report (TIER), fracture transport of aqueous-phase TCE and cDCE is still occurring, but competing processes are at work: the solubility of the VOCs and favorable concentration gradients can mobilize VOCs into the aqueous phase, while matrix diffusion and sorption of VOCs can sequester VOCs into the rock formation. The rock formation plays a primary role in attenuating the contaminant mass and preventing further contaminant transport. Because the plume is so old, the rock formation has, for the most part, attenuated further contaminant transport. At the leading edge of the plume (for example, as it approaches the Park Avenue wellfield), there is little rock matrix diffusion, a very small concentration gradient, and a tremendous amount of rock surface area for the (relatively low concentration) aqueous-phase VOCs to sorb to.

VOCs in the rock matrix pore water are inaccessible to any VOC treatment technologies with the possible exception of heating, though heating has serious limitations (as discussed in the FS and Proposed Plan). VOCs are expected to remain within the rock matrix for centuries.

1.2.3: A commenter indicated that EPA needs to do a better job identifying drinking water wells in area, and should test "all the homes within a one mile radius of the site for vapor intrusion." In a subsequent comment from the same party, the commenter stated that EPA must perform a comprehensive vapor intrusion testing program under the plume area, as well as outside the known plume, to see if the plume is in fact defined. EPA should have learned from the Pompton Lakes-DuPont Works site that walking away from a problem like this is only going to come back to be a major public health and safety issue in the future.

Response: EPA agrees that further efforts to identify private drinking water wells are worthwhile, and that vapor intrusion monitoring is also warranted. Both these steps were part of EPA's Preferred Alternative in the Proposed Plan. Vapor intrusion testing performed to date has addressed the most likely areas for vapor intrusion testing, where VOCs have been detected in shallow monitoring wells, and has not identified a vapor intrusion problem associated with the site. An arbitrary one-mile testing radius is not warranted at this site.

The absence of vapor intrusion instances in this case only underscores the fact that each site is different. The Agency is committed to additional monitoring in any case.

1.2.4: A commenter stated that contaminated groundwater is seeping into the Bound Brook, which travels through South Plainfield and eventually empties into the Raritan River. Because of the high levels of PCBs in the Bound Brook, there are fish consumption advisories in place, yet families and children are still exposed to the chemicals from playing and fishing at "derbies" at New Market Pond.

Response: EPA acknowledges the value of understanding the groundwater-surface water interactions prior to moving forward on a groundwater remedy for the limited areas of the groundwater near the Brook, and has deferred the remedy for that portion of the groundwater. However, it is important to understand that the fishing advisories were established because of the presence of PCBs in the Bound Brook, not because of TCE. While PCBs are found in groundwater at the location of the former CDE facility, TCE and its breakdown products are the groundwater constituents that have migrated away from the facility, and that are the focus of the EPA's sampling of the groundwater.

With respect to PCBs, surface transport – runoff of PCB-contaminated soil - and direct dumping of waste materials in areas directly adjacent to the Bound Brook were the primary means by which PCBs were released to the Bound Brook from the former CDE facility, and EPA expects that groundwater transport, if it is occurring, is a minor factor.

Likely fishing locations along the Bound Brook, including New Market Pond, are posted with signs alerting anglers not to eat fish. Piscataway Township does not identify New Market Pond as a location for recreational fishing, and while fishing occurs, in speaking with Piscataway parks and recreation officials, they are aware of the fishing advisories and do not hold fishing derbies at New Market Pond. The last fishing derby in Piscataway, in 2010, was held at a Johnson Park Pond, a location not associated with the Bound Brook.

1.2.5: R.W. Chapin, commenting on behalf of the Edison Wetlands Association (EWA), a local environmental group, noted that OU3 includes the groundwater underlying the former CDE facility as well as the larger area impacted by the releases from CDE. He stated that it is difficult to locate the "specific area of groundwater contamination" in the Proposed Plan, but noted that EPA identifies an area of 825 acres of the bedrock within the aquifer as being impacted. He assumed that 825 acres represent the total area of OU3, calculating an area of 1.29 square miles, or 15 percent of the area of the Borough of South Plainfield.

Response: The Proposed Plan includes Figures 2 through 7 that depict the results of the RI and the extent of OU3. The description of the Preferred Remedy in the Proposed Plan indicates that several additional monitoring locations will be needed. The Proposed Plan also explains that regional sources not associated with the site make it unlikely that EPA will be able to find locations to install monitoring wells where the groundwater will meet federal and state drinking water standards to establish as boundary conditions for the CDE plume.

1.2.6: R.W. Chapin on behalf of EWA stated that primary contaminants in groundwater are TCE, 1,2-cDCE and PCBs. The Proposed Plan states the PCB contamination in groundwater is present at the former CDE facility property, but not elsewhere in the larger area of contamination associated with the site; however, the commenter stated "all data tables have not been checked to verify this statement." The presence of PCBs in groundwater at the levels EPA reports is unique, as they exceed the aqueous solubility of PCBs. PCBs are highly soluble in TCE, and the PCB has been "carried" into the groundwater by the TCE.

It is unclear from the comment whether the commenter means to suggest that he has not "verified" the statement himself or that EPA has not. However, at the August 7, 2012 Public Meeting, Mr. Chapin referred to Table 5-8 of the RI, containing data from EPA's monitoring well MW-20, as indicative of elevated PCB concentrations. In a separate written comment, the commenter referred to data for MW-22 (also Table 5-8 of the RI), where 71 of the 209 PCB congeners were present. The commenter noted that MW-22 is a significant distance away from the former CDE facility.

Regarding the PCB congener data, the commenter noted that no comparison of the congeners to the "signature congeners" for the CDE site was presented. He stated that the Proposed Plan summary of the BHHRA states that PCB hazards are unacceptable, but then states PCBs have not left the site. The commenter asserted that data in Table 5-8 indicates that this is not a valid statement and PCBs have left the CDE site. The issue of PCBs in groundwater is not addressed by the Proposed Plan, and this is a significant flaw.

Response: PCB Aroclors were detected in groundwater samples collected from several monitoring wells located away from the footprint of the former CDE facility, as stated in the RI, BHHRA, and FS. The BHHRA used data for total PCB Aroclors to evaluate the potential for human health risks from exposure to PCBs, relying on an extensive groundwater dataset for PCB Aroclors. Because 12 of the 209 possible PCB congeners have been shown to have dioxin-like toxicity, 24 samples from a select group of wells/depths (including MW-22) were also analyzed for PCB congeners and dioxin/furans so that the potential for human health risks posed by those particular PCB congeners and the toxic dioxin/furan congeners could be evaluated as 2,3,7,8-tetrachloro-dibenzodioxin (2,3,7,8-TCDD) Toxic Equivalence (TEQ), using the available toxicity values for 2,3,7,8-TCDD. Health risks (cancer risk and/or non-cancer hazard) from exposure to total PCB Aroclors were indicated for all receptors potentially exposed to all evaluated groundwater datasets: i.e., the entire aquifer (including PCBs detected in off-site wells), the shallow groundwater south of Bound Brook, and the shallow groundwater north of Bound Brook. Health risks from exposure to 2,3,7,8-TCDD

TEQ were also indicated for all receptors potentially exposed to the entire aquifer dataset. This is discussed on pages 6-1 and 6-2 of the BHHRA. Note, however, that the "entire aquifer" dataset includes highly contaminated wells and wells where no PCBs were detected, and the actual extent of PCB contamination is much more limited than the "entire aquifer."

Dioxin/PCB congener data for groundwater were collected and reported on Table 5-8. PCB congeners were detected in groundwater samples collected from monitoring wells located away from the footprint of the former CDE facility, as stated in the RI, FS, and BHHRA, and are reported in picograms per liter, or parts-per-quadrillion, concentrations on Table 5-8. Dioxin/furan data is also reported in these units, whereas other groundwater data is reported in micrograms per liter (parts per billion); this reporting difference may have been a source of confusion for the commenter. Note that the six sample locations with elevated dioxin TEQs were all collected from wells at the former CDE facility, and show excellent correlation with elevated PCB Aroclor concentrations. PCB Aroclor results collected from monitoring wells located away from the footprint of the former CDE facility are below the drinking water standard (0.5 ppb) and do not pose a risk to receptors.

The high concentration of PCBs in a monitoring well (MW-14S), installed at the former CDE facility property, is not unique to this site, as it is common for PCBs to be detected at high concentrations at or near areas of discharge or source areas. Page 5-14 of the RI Report states:

> "The concentration of PCB (Aroclor 1248) was 7,300 μg/L in one sample from MW-14S-04 during the October 2009 sampling event. This concentration exceeded the aqueous solubility limit for PCB (Aroclor 1248) of 100 μg/L. In addition, the concentration of PCB (Aroclor 1254) was 5,600 μg/L in one sample from MW-14S-04 during the October 2009 sampling event. This concentration also exceeded the aqueous solubility limit for PCB (Aroclor 1254) of 10 μg/L. This indicates that PCBs (Aroclor 1248 and 1254) were present in the groundwater collected during the October 2009 groundwater sampling event at concentrations indicative of the presence of NAPLs."

In addition, these concentrations suggest some nonaqueous phase liquid (NAPL) was incorporated into the sample, which is reasonable to expect given the well location within the source zone where NAPL was known to be present. It is known that TCE can enhance the solubility of PCB, and, as stated on Page 6-8 of the RI Report, “Due to the presence of DNAPL, some degree of co-solvent enhanced solubility and/or mobility of pesticides, PCBs, and dioxins/furans is possible.”

A determination of “signature congeners” for the CDE site was not made for groundwater. This type of analysis is useful when there are likely to be multiple PCB sources and determining a PCB source is important (e.g., for an enforcement case). Because of the lack of evidence of off-site migration of PCBs, it is not relevant to OU3.

1.2.7: R.W. Chapin on behalf of EWA stated that, according to the OU3 RI Report, there are major withdrawals of groundwater in the area impacted by CDE-contaminated groundwater. The following wellfields, owned or operated by the Middlesex Water Company, are located within or adjacent to OU3: Park Avenue (active), Tingley (inactive), South Plainfield (inactive), Sprague (active), and Spring Lake (inactive). The water withdrawn by these wells does not meet New Jersey Drinking Water Standards and requires treatment to remove TCE before it is potable. Under the Proposed Plan, this requirement will continue indefinitely, with the cost of that treatment being passed on to the consumer.

In a subsequent comment, the same party added that the Preferred Alternative transfers the cost of groundwater cleanup directly to the public: the public potable water supplies impacted by CDE must treat their water to remove chlorinated VOCs prior to distribution. Doing nothing to address the CDE groundwater contamination allows that contamination to continue to impact these potable water supplies.

Consequently, CDE contaminants must be removed before that water may be consumed and the cost of that treatment becomes part of the water bills of the customers of the Middlesex Water Company. EPA is requested to provide other specific locations where its Superfund program transferred the cost, hence the responsibility, to the general public. Those costs should be borne by the responsible party for the CDE site.

Response: The commenter's suggestion that there are currently major groundwater withdrawals from the area "impacted" by the CDE plume is not supported by the OU3 RI or the Administrative Record. The RI does state that, when it was operating, Spring Lake withdrew water from within the area now designated as the TI zone, with elevated, site-related constituents in the pumped water. With regard to the Park Avenue wellfield, the RI states (Page 7-7):

> "MWC Well No. 25 [which is located outside of the TI Zone as shown in the RI] has been identified as a potential receptor of TCE from the former CDE facility. Water quality samples collected at the MWC wellfield treatment plant (that combines the groundwater from all of the MWC wells at the Park Avenue wellfield) contains roughly 3 ug/L of PCE and 1.5 ug/L of TCE as shown on Figure 5-42. However, given the large capture zone created by the high rate of pumping at the Park Avenue wellfield (Figure 4-7), the occurrence of multiple CVOC source areas in the area, the fact that there is no current water quality data from each water supply well at the Park Avenue wellfield, and insufficient monitoring well data near the Park Avenue wellfield, there is insufficient information to confirm that the leading edge of the former CDE facility CVOC plume has reached the Park Avenue wellfield."

The primary wellfield that influences CDE plume direction is the Park Avenue wellfield. At its current level of withdrawal (an average of nine million gallons per day), it influences the direction of groundwater flow over a very large area. The RI concludes that VOCs from the CDE site probably reach the nearest of the 15 Park Avenue wells, though at a relatively low concentration. The most elevated constituent of concern at the Park Avenue wellfield is tetrachloroethylene (also known as perchloroethylene, or "PCE"), a constituent not associated with the CDE site. Modeling groundwater movement and contaminant transport in the RI required an intricate understanding of the breadth of influence of current and former public water supply pumping, and while the RI results leave some room for debate, they do show that the CDE plume could be, at most, one of a number of contributors to exceedances at active wellfields.

Irrespective of any actions by the Agency with regard to the OU3 plume, regional conditions will result in elevated influent concentrations for public water supply wells in this part of New Jersey today and in the future. The comment suggests that, absent the CDE plume, treatment would not be needed, or might be measurably lessened, and EPA's lack of a plume cleanup passes on costs to consumers, who need to pay additional costs for water treatment in their water bill. In EPA's view, this supposition is not correct. MWC's primary treatment method is air stripping and, in EPA's experience, the unit cost of operating an air stripping tower does not vary with concentration at the levels detected in the influent water. Moreover, the RI concludes that the CDE plume is not expected to expand or result in increasing contaminant concentrations at currently active pumping centers, including Park Avenue. EPA's selected remedy includes monitoring to confirm that the CDE plume is not expanding.

Active pumping from public water supply wells has been included as a component of the selected remedy at a handful of NPL sites. That is not the case here: the public water supply wells are not "remediating" the plume over the long term, or even performing a containment function. Historic pumping has had a role in defining the shape of the contaminant plume; however, the RI concludes that these ongoing withdrawals have little, if any, ongoing influence on the further expansion of the plume.

1.2.8: R.W. Chapin on behalf of EWA stated that OU3 is in an area of fractured, sedimentary bedrock, which has been subject to various tectonic forces that have tilted, folded and fractured these beds. As an aquifer, this formation can be characterized, generally, as heterogeneous and anisotropic. Mr. Chapin cited the New Jersey Geologic Survey's recently published Bulletin 77, "*Contributions to the Geology and Hydrogeology of the Newark Basin*", 2010, which includes a paper describing how the Passaic Formation (the primary geologic unit at OU3) behaves relative to groundwater flow and contaminant transport. Mr. Chapin further stated that this description, known as the Leaky Multi-unit Aquifer (LMA) model, has been shown to be accurate and has been applied to other New Jersey Superfund sites, such as the Rocky Hill Municipal Well Field in Rocky Hill, New Jersey.

Response: The RI is grounded upon published geologic literature, and then relies on site-specific data to support or modify broad aquifer generalizations, applicable under many circumstances, to measured local conditions.

The RI report (Page 4-11), supports the conclusion that the main transport for mass discharge of VOCs from the former CDE facility down-gradient was in the aqueous-phase through the bedding plane fractures, which have relatively high transmissivities compared to other fracture sets documented in the RI. However, the lack of any significant changes in hydraulic head vertically within the bedrock unit (see Vertical Head Profiles on Figure 4-13 in the RI Report), and the distribution of VOCs in the matrix diffusion pore water (Figures 5-1 through 5-4 in the RI Report) at the former CDE facility, shows the hydraulic interconnectedness of the fractures above and below the bedding plane fractures, and that there is significant Darcy flow horizontally through the bedrock above and below the bedding plane fractures. Therefore, the LMA model (layers of semi-confining units separated by transmissive aquifers/bedding planes) does not represent groundwater conditions at the former CDE facility with significant accuracy given the detailed data sets acquired at the site. The fractured bedrock aquifer beneath the CDE site can be characterized as a highly fractured, well connected and transmissive flow system with preferential flow along bedding plane fractures.

The Rocky Hill Municipal Well Field site is located approximately 20 miles from South Plainfield, and while there are many variations in geologic conditions over that span of distance, it is also located within the Newark Supergroup, and wells are installed in the Passaic Formation. Whether an LMA model adequately describes conditions at that site is not relevant to the remedy selection process for this site.

1.2.9: R.W. Chapin on behalf of EWA stated that the LMA model predicts contaminant transport down the bedding plane of the formation. Per the RI, the bedding planes dip to the northwest at a 5° to 15° angle. Mr. Chapin included the TCE isocontour cross-section figure from the Proposed Plan modified with the bedding plane dip as an attachment[1]. These isocontours clearly show migration down-dip. Mr. Chapin also noted that the RI Report refers to "horizontal" bedding planes, and these are not present within OU3.

[1] Mr. Chapin’s referenced figure can be found in the original comments, included as an attachment to this Responsiveness Summary.

Response: Please refer to the response to Comment 1.2.8. The RI report (Page 4-4) also states and shows on numerous figures (Figures 4-9 through 4-11 and 5-5 through 5-21) that VOCs are being transported down-dip in the bedrock, as shown in the commenter's cross section figure attached to the comment. Mass transport along bedding planes is clearly one factor in the mass transport history of the plume, it is just not the only (or even, currently, the predominant) factor.

The text on Page 4-5 of the RI Report states: "Weathered fracture zones within the bedrock ranged from near [emphasis added] horizontal to near vertical." "Near horizontal" is referring to the shallow "5 to 15 degree" bedrock dip, which is common terminology used to represent very shallow (5-15 degree) dip in fracture or bedding surfaces.

1.2.10: R.W. Chapin on behalf of EWA stated that modeling performed for the RI/FS, used in the Technical Impracticability Evaluation Report (TIER) and to support the Proposed Plan depicts the bedrock within OU3 has having homogeneous flow characteristics; this is contrary to a LMA model of the aquifer. No basis for using this approach is readily apparent. The commenter further stated that the project's Quality Assurance Project Plan (QAPP) addresses only sampling and analysis, and that nowhere in the RI, the TIER or the Proposed Plan did EPA verify that the computer model selected is, in fact, accurate and representative of the real world.

The commenter also noted that the RI Report, TIER and Proposed Plan were obtained from the South Plainfield Library (which holds a copy of the Administrative Record), but that these documents do not appear to be complete. The following examples are cited: documents referred to by the TIER Appendix A as "short articles" are not included; along with a reference, also in Appendix A, to a February 2011 Technical Memorandum concerning modeling, that is also not included. The commenter suggested that these documents may provide additional understanding, but that all key documents must be available to the public, and a revised, all inclusive set of documents is needed for the Administrative Record.

Response: As to the site characteristics conforming to the LMA model, please see Response to Comments 1.2.8 and 1.2.9.

The basis for selecting and using the MODFLOW groundwater flow model is provided on Page 3 of the Groundwater Modeling Report, Appendix P of the RI Report. Additional hydrogeologic information that supports the use of the MODFLOW groundwater flow model can be found in the RI Report.

The model verification is also provided in the Groundwater Modeling Report (Appendix P). The groundwater flow model was calibrated with empirical data collected at the CDE site, as described in the Groundwater Modeling Report. The model calibration and sensitivity analysis are described on Pages 10-16 of the Groundwater Modeling Report and show that the flow model accurately represents the observed groundwater conditions.

The "nine short articles" are publicly available; however, it was the intention to include them in two places in the Administrative Record, in the TIER report at the end of Appendix A (immediately before the Appendix B flysheet) and in the FS Report at the end of Appendix B. This was an oversight.

The February 2011 Technical Memorandum is a draft scoping memorandum that was identified in the FRACTRAN report but was not intended for the final report. As a draft, and only an incremental step in the analysis, it contains a slight discrepancy in the direction of groundwater flow, and refers to an optional task that was not performed. The reference to the February 2011 Technical Memorandum should have been removed from the final document.

Both the "nine short articles" and the February 2011 Technical Memorandum were added to the Administrative Record and emailed directly to the commenter.

1.2.11: R.W. Chapin on behalf of EWA stated that the modeling used a discrete fracture network approach to contaminant transport [known as FRACTRAN]. No statements that the model was verified as accurate were found in an initial review of the modeling report appended to the TIER. The accuracy of the model must be verified by comparison of predicted results to actual field measurements. Projections based on an unverified mathematical model are not useful.

Response: The FRACTRAN model was calibrated using empirical data collected at the CDE site, as described on Pages 9-11 of the FRACTRAN modeling report, which is included as Appendix A to the TIER and as Appendix B to the FS Report. This comparison shows the FRACTRAN model accurately reproduces the observed conditions. The model was verified using standard model calibration techniques and site-specific data.

1.2.12: A group of environmental nonprofit groups stated that the section of the Bound Brook that is contaminated also runs through the 1,250-acre Dismal Swamp Conservation Area (DSCA), which they indicate is home to over 175 species of birds, 25 species of reptiles and amphibians, and 25 species of mammals. The commenters also state that the DSCA contains EPA federal priority wetlands and is a state-recognized conservation area.

Response: While the Bound Brook originates in the Dismal Swamp and travels past the CDE site, areas considered part of the Dismal Swamp start over a mile upstream from the CDE site. The OU4 RI/FS is planned for 2013 and it will consider the Bound Brook in its entirety; however, it is not possible for the CDE site to have directly contaminated the Dismal Swamp. This is also true for groundwater: the direction of groundwater flow is away from the Dismal Swamp.

This comment states that the section of Bound Brook that passes through the Dismal Swamp is contaminated. EPA has made no such finding.

1.2.13: A commenter noted that, by EPA's own admission, the extent of the seeps from groundwater into the Bound Brook are still undetermined and in violation of the Clean Water Act.

Response: While it is true that EPA has not yet determined the impact of groundwater seeps on the Bound Brook, EPA has made no finding whatsoever regarding the either the discharge of contaminated groundwater to surface water in the Bound Brook, or the application of the Clean Water Act to any such discharge.

1.2.14: R.W. Chapin on behalf of EWA stated that the terms "adsorbed" and "absorbed" are both used, but nowhere is it stated which controls. If chlorinated VOCs were adsorbed completely (or electrochemically bound within the rock matrix) there would be little or no movement out of the matrix. Conversely, if constituents were absorbed they would be in solution and free to move out of the rock. Obviously, the degree to which the bedrock will act as a source for continuing CVOC contamination of groundwater depends on whether adsorption or absorption controls. The documents reviewed do not define which process controls the bedrocks behavior. The mechanism controlling movement from the bedrock must be explicitly defined.

Response: The RI (Chapter 6) discusses "sorption" phenomena (among other phenomena) to describe the fate and transport processes that chlorinated VOCs may undergo in the rock formation. In fact, both the adsorptive and absorptive properties of the rock matrix are at work within the Passaic Formation. It is not accurate to assume that adsorption into the rock matrix is irreversible. In addition, while contaminant concentration gradients between the fracture water and rock matrix pore water may lead to back diffusion of contaminant mass out of the rock matrix into fractures (this is occurring today), back diffusion (such that the mass in the pore water is "…free to move out of the rock") is not enough to effectuate a cleanup, as the comment suggests. Even with a steep concentration gradient, it is the time it takes for contaminants to back-diffuse from the pore water to the fracture water, when the fracture water volume is over 10,000 times smaller than the pore water volume, that limits contaminant removal.

1.3 Extent of TI Zone and Other VOC Sources in the Aquifer

1.3.1: One commenter noted that the boundaries of the OU3/TI Zone are based upon extrapolation of sampling data to the 1 microgram per liter (1 μg/L, the same as 1 ppb) isoconcentration level, rather than actual data points, and this extrapolation cannot confirm that the groundwater TCE concentration beyond this boundary is less than 1 μg/L, the current New Jersey drinking water standard. The boundaries of the contaminated area should be validated by field test results.

The same commenter noted that influent data from the Park Avenue wellfield exceeded New Jersey's drinking water standard, yet the Park Avenue wellfield and the "surrounding area" was excluded from the OU3/TI Extent area based upon "other sources of similar contaminants within or near the study area". The commenter also stated that the RI does not provide enough details about these "other sources" to justify this exclusion. The commenter noted that he owned a private well outside the CDE TI Zone, and the RI data appeared to leave an area of uncertainty as to whether his well might become contaminated in the future, concluding: "In order for the proposed countermeasures to be effective, accurate delineation of the extent of contamination, with incorporation of a reasonable margin of safety, should be considered."

Response: As discussed in the Proposed Plan, an improved monitoring well network is needed to adequately assess the long-term conditions in the plume area, and the RI recommends several additional monitoring points. If possible, EPA will establish clean boundary, or "sentinel," wells. The Proposed Plan also explains, however, that the presence of multiple sources of groundwater VOC contamination within the zone of influence of the active water supply pumping centers, discussed in the RI, makes it unlikely that EPA will be able to locate monitoring points where the groundwater will meet state or federal drinking water standards. In particular, concentrations of PCE, a non-site-related constituent, actually exceed that of TCE or 1,2-cDCE in the MWC influent.

The commenter has provided the location of his well. The relationship of this private well to the CDE site and the Park Avenue wellfield is such that it is not possible for CDE site constituents to migrate to this location.

1.3.2: R.W. Chapin on behalf of EWA stated that neither the Proposed Plan nor Administrative Record contained calculations of the total mass of TCE within the 1.29-square mile TI zone (both groundwater and rock) or the total mass solely within the rock. He stated that this is a fundamental piece of data that must be provided by EPA, along with the calculations. The Proposed Plan states that the majority of the TCE mass resides within the rock and there is currently no means to validate that statement.

In a subsequent comment, the commenter stated that the modeling predictions must be verified via a quantitative mass evaluation: at the public hearing it was stated that the mass of the contamination within the rock matrix is not known. The RI modeling was reviewed to elicit specific quantifications of mass and none were found. Yet, the modeling as currently configured has the mass within the rock maintaining current groundwater contaminant levels for hundreds of years, and this is the basis for EPA choosing to do nothing. As presently configured, the modeling assumes there is sufficient contaminant mass within the bedrock to maintain current contamination levels. What mass is required to do that? Does the bedrock contain that required mass?

Since the model obviously assumes it does, how is that known? Was the same bedrock concentration assumed throughout the entire modeled zone?

The commenter states that VOC contaminant concentrations within the rock matrix were “calculated” using the pore water analyses, yet no technical appendix provides those calculations and no validation of those calculations was found in the documents reviewed. As this is a fundamental factor in the modeling, these calculations must be validated.

> Response: Providing an estimate of the total contaminant mass in the bedrock at the CDE site is beyond the limits of the data collected during the RI. It is also not necessary to calculate the total contaminant mass in the bedrock in order to reach the conclusion about the location of the contaminant mass set forth in the Proposed Plan.
>
> The statement that the majority of mass resides in the bedrock can be validated with empirical data collected during the RI. The data from bedrock core samples show that the porosity of the bedrock matrix is approximately 10 percent and the porosity of the bedrock fractures is approximately 0.001 percent. These data indicate that the bedrock has the ability to store four orders of magnitude more of the contaminant mass by volume than the fractures. The detection of high concentrations of TCE in the bedrock pore water at a high frequency (e.g., the rock matrix was sampled every two feet in the MW-14S/14D bedrock core, with high TCE concentrations measured at each two-foot sample interval through almost the entire core) suggests that the bedrock matrix blocks have been entirely invaded with TCE.
>
> Knowing the total amount of contaminant mass within TI Zone is not critical to selecting a remedy for the site groundwater. The important information for remedial decision-making is determining the degree of bedrock matrix diffusion: is it occurring, how far has the contaminant invaded the matrix, does it occur down-gradient of the known source area(s) of the site, what are the matrix pore water concentrations, and is it feasible to remediate/reduce those concentrations in the bedrock matrix using available technology to concentrations below MCLs in

a practicable manner. In fractured rock systems, the contaminant mass flux in the bedrock aquifer is another general indicator of the degree of contaminant matrix diffusion and the ability of the contaminants in the rock matrix to back-diffuse and “feed” the fractures for downgradient aqueous transport. The mass flux has been estimated to be 0.67 and 1.27 lbs/day during the integrated pumping tests conducted in shallow and intermediate test wells at the former CDE facility (see Figures 5-40 and 5-41 of the RI Report). These data support the conclusion that there is significant TCE mass in the bedrock pore water (i.e., adsorbed and aqueous phase) that is contributing to aqueous-phase (dissolved) TCE in the fractured bedrock. In addition, given the significant age of the plume and the high attenuation capacity of the porous bedrock, it is likely that the plume is not expanding.

While it is not possible to calculate the quantity of chlorinated VOCs in the whole of OU3, it is possible to approximate a contaminant mass at a particular location to illustrate that the VOC mass is primarily in the pore water. For example, the area considered in Alternatives 3a and 4a targets an area of roughly two acres to an assumed saturated thickness of 45 feet, the most highly contaminated area at the former CDE facility. Given the measured matrix porosity of 10 percent and fracture porosity of 0.001 percent and roughly the same concentration of VOCs in the pore matrix and the neighboring fractures[2], roughly 4,800 pounds of VOCs would be contained in the matrix porosity while only 0.5 pounds of VOCs would be contained in the fractures. (This example is a simplified illustration of the difference in the contaminant mass that resides in the matrix pores as compared to the factures, and not as a calculation of actual mass.)

VOC porewater concentrations within the rock matrix were calculated and are provided in the RI Report in Appendix E (Rock Core Sampling and Analysis at the Cornell Dubilier Electronics Superfund Site, June 4, 2010, Stone Environmental Inc.).

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[2]Alternatives 3a and 4a target areas with VOC concentrations in excess of 25,000 ug/L, but this boundary condition does not allow the calculation of mass. This example conservatively assumes an average concentration of 190,000 ug/L throughout a rock volume measuring 300 feet by 300 feet by 45 feet thick.

See also Response to Comment 1.3.3.

1.3.3: R.W. Chapin on behalf of EWA stated that there were rock cores analyzed to evaluate the TCE content of the fractured, sedimentary bedrock (which the RI/FS refers to as the rock matrix or rock matrix pore water). These cores, according to the RI, came from borings that essentially lie along the center line of the contaminated area. The results of these analyses were then applied to the entire area of contamination, which assumes the TCE movement into the bedrock matrix was uniform and consistent throughout the contaminated area. There is no technical basis for this assumption [of uniform movement], which simply could be grossly overestimating the extent of the bedrock contamination. Additional investigation is required to ascertain the true extent of TCE within the rock matrix. EWA separately made a similar comment, questioning whether EPA had performed sufficient rock coring to evaluate the extent of rock matrix diffusion. EWA stated that EPA collected rock cores at four locations for an area of over 800 acres, or one core for every 200 acres, and that appears to be inadequate.

In a subsequent comment, R.W. Chapin expanded on this issue, stating that analyses of rock cores were used to define the contamination within the rock. Those cores were taken from a line of borings that reside along the north-south center line of the groundwater contamination. No cores were analyzed at any points either east or west of that line. What is the rock contamination profile along an east west axis? Is it actually the same? Or is there a gradient? What mass of chlorinated VOC is present along the north-south axis? And is it the same along an east-west line?

Response: The results of the rock core borings that "essentially lie along the centerline of the contaminated area" were not "applied to the entire area of contamination." In other words, the RI does not extrapolate concentrations of TCE to other areas of the bedrock from these borings. The data from these center-line borings show that matrix diffusion of contaminants into and out of the bedrock matrix is occurring and there has been significant contaminant invasion into the bedrock matrix blocks in the on-site source area. Because the dissolved-phase contaminant plume has been pulled in an east-west direction in response to pumping from various water supply wells, it is therefore reasonable to assume contaminant invasion into the rock matrix throughout the entire footprint of the dissolved-phase contaminant plume.

The data from the center-line borings also show that the porewater and aqueous fracture concentration of TCE is in approximate equilibrium near the source area in the overburden at MW-14S/D and that TCE continues to diffuse into the bedrock porewater in the more distal end of the contaminant mass at MW-16 and MW-20. This confirmation of the matrix diffusion process in selected areas (MW-14 S/D, MW-16, and MW-20) allows for an extrapolation of the matrix diffusion process to other portions of the study area, where porewater concentrations can then be evaluated based on the detected aqueous concentrations of TCE.

The commenters appear to envision groundwater (and contaminant) flow as predominantly via a series of bedding plane fractures, whereas the actual picture is more complex. The information conveyed by analysis of the fracture network, measured aqueous-phase concentrations, pump test data, geophysical tests, and the rock core data is more subtle but still unambiguous: VOC mass is distributed throughout the aquifer independent of the proximity to fractures. In fact, elevated pore water concentrations were detected in the center of matrix blocks in the absence of any visible fractures whatsoever. This is commonly seen at similar porous fractured bedrock sites.

1.3.4: R.W. Chapin on behalf of EWA stated that, as stated in the RI Report, EPA has not achieved vertical or horizontal delineation of TCE. Limits of the proposed TI zone are based on modeling, yet the actual data indicates “no delineation.” When there is a conflict between projected site conditions (i.e., a mathematical model) and actual field measurements, the actual data must be used. Given that the intent is to only monitor and that a significant potable water supply relies on a “highly contaminated” aquifer, it is critical to define the full areal extent of monitoring required.

Response: The limits of the TI zone were determined using the existing empirical data and an understanding of the fate and transport of TCE in porous fractured bedrock. The empirical data was supported with MODFLOW groundwater flow model and FRACTRAN DFN model results, and the computer modeling was calibrated with site-specific data. A non-computer evaluation and interpretation of empirical data was used to document site conditions and identify the limits of the TI zone. As stated throughout the

Administrative Record and in the Proposed Plan, long-term monitoring of site conditions will benefit from a more comprehensive well network, but these additional data points are not expected to inform EPA's decision-making process to any significant degree.

1.3.5: R.W. Chapin on behalf of EWA stated that the presence of alternate TCE sources is alluded to in the Proposed Plan and the TIER, but no concrete evidence is provided. All alternative sources must be clearly documented and their impact on OU3 defined.

Response: EPA agrees with this comment insofar as EPA did not clarify that it has not identified other TCE sources within the scope of the OU3 study area, e.g., within the TI Zone. The RI discusses nearby TCE (and other VOC and PCB) sites in Section 5.13, drawing data from EPA's CERCLIS database and NJDEP's Known Contaminated Sites (KCS) list. See also Figures 5-34 and 5-35 of the RI Report. The discussion at section 5.13.2 of the RI Report about the area known as the "Pitt Street Groundwater Contamination" demonstrates the challenges faced by this type of analysis. The Pitt Street area is close to the CDE site and is predominantly a TCE problem, so based on the simple fact of proximity one might conclude the CDE was the source of this contamination; however, the RI Report discusses several site conditions that support a conclusion that CDE is not the source. Further investigation of the Pitt Street Groundwater Contamination, which is not a CERCLA site, would be needed to adequately understand this site.

1.3.6: R.W. Chapin on behalf of EWA stated that, regarding the active discharge of contaminated groundwater into the Bound Brook, the issue will be addressed as part of OU4; consequently, actions could be taken to eliminate/control the contaminated groundwater discharge into the Bound Brook at some time in the future. But EPA did not specify when such an action might be taken.

Response: The commenter assumes that contaminated groundwater discharges to Bound Brook. This is very likely given shallow water level measurements collected as part of the OU3 RI. However, EPA will review the results of the whole of the OU4 RI (which will include the OU3 findings) before making conclusions about the effects that the groundwater may have on the surface water.

EPA will determine whether any action is needed with respect to potential groundwater discharges to the Bound Brook in the context of the OU4 remedy selection. EPA has stated that it plans to complete the RI/FS and select a remedy for OU4 in 2013 and at that time, EPA will specify what action, if any, should be taken.

Subpart 2: Questions and Comments on EPA's Preferred Alternative

2.1.1: A commenter noted that additional measures should be taken to identify active potable drinking water wells in South Plainfield. Existing databases are inadequate to identify older private wells. The commenter noted that several residents in his neighborhood still use private wells, and are unfamiliar with the issues noted in the Proposed Plan. Ongoing monitoring efforts should encompass not only existing monitoring wells, but should also include frequent groundwater sampling of any active potable wells identified in the area. Any concerned South Plainfield residents who are utilizing a private well should be offered routine monitoring, regardless of their location in relation to the CDE site. A separate commenter noted that South Plainfield has banned use of private wells, yet residents are still drinking well water.

Response: With a few exceptions, residents and commercial occupants of the Borough are already connected to a public water source. EPA supports any efforts that would result in the identification and testing of private wells and prevent exposure to contaminated drinking water. The OU3 remedy selected by EPA incorporates additional efforts to identify wells still in use within the TI zone. Please note that other potential contaminant sources exist within Middlesex County, and that potable well testing is appropriate for any private well in this area, whether or not the source of identified contamination might be the CDE site.

EPA knows of private wells in South Plainfield but has found none in the TI zone. South Plainfield does not have an ordinance preventing the use of private wells. The State of New Jersey can request that a municipality require connection to a public water supply and a municipality can make that a requirement.

2.1.2: A commenter stated that any resident utilizing a private well for drinking water that is found to have contamination at a level exceeding current drinking water standards should be provided a connection to the municipal water system, at no expense to the resident. This is an effective way to mitigate contact with the contamination and should be factored in to the cost estimate of the Preferred Alternative. Furthermore, EPA's remedy should also consider the potential that additional drinking water wells might show contamination over time and should incorporate the necessary contingency to address them as they are identified.

Response: No private wells have been identified within the TI zone. CERCLA cost-estimating is expected to address known, or likely site outcomes, but not hypothetical circumstances such as the one suggested by the commenter.

Both NJDEP and EPA have emergency response programs to address newly identified drinking water exposures. Under certain circumstances, a resident utilizing a private well may be able to obtain reimbursement of the cost of connecting to a public water supply from New Jersey's Spill Fund, with proper notice to NJDEP.

In EPA's assessment, the CDE groundwater contamination is not expected to expand into new areas. Confirming that conclusion over the long term is one of the purposes of the monitoring program included as part of the selected remedy.

2.1.3: A commenter recommended that EPA conduct source removal of the "most toxic groundwater directly under the site," and the commenter stated that EPA's preferred alternative (Alternative 2, long-term monitoring) was "flawed," and EPA should instead be cleaning up the groundwater.

Response: EPA does not agree. EPA's Proposed Plan, and documents in the Administrative Record including the RI and FS reports, and the TIER, explain in great detail why it is technically impracticable to clean up the groundwater to meet federal and state drinking water standards.

2.1.4: The South Plainfield Environmental Commission (SPEC), a municipal entity, did not support the choice of Alternative 2. SPEC suggested that a third party might be consulted that, using a different model, might come to different conclusions about the feasibility of cleaning the aquifer. Furthermore, mitigation that cannot be accomplished in the near term might be accomplished over time. EPA's definition of a reasonable timeframe should be extended beyond the standard thirty-year EPA benchmark, even into centuries if necessary.

If nothing is done to remove the TCE from the groundwater, it will certainly still be there three hundred years from now. Will the population residing here in 2312 remember that they are not supposed to dig wells?

Response: EPA's findings are based on the Administrative Record. EPA welcomes external scrutiny of the site data and the RI/FS modeling efforts. However, as noted in the Overview, EPA has undertaken a highly sophisticated investigation of a complex set of site conditions, which included some of the foremost experts in the field of hydrogeology. EPA is satisfied with the accuracy of its findings.

EPA typically uses a 30-year benchmark for cost-estimating. This is not a default evaluation period for remedy performance. EPA did not evaluate remedies for the whole 825-acre area of contamination because there are no technologies available to treat matrix diffusion on this scale.

EPA evaluated active remedies (Alternatives 3 and 4) for the most highly contaminated area near the former CDE facility by using computer modeling to project the results that would be achieved after periods of 50, 100, and 150 years. EPA found that any reduction in concentrations of groundwater contaminants through treatment or containment would be negligible. In effect, whether or not EPA were to undertake the limited actions described in Alternatives 3 or 4, TCE would remain in the aquifer 300 years from now, and probably longer.

2.1.5: R.W. Chapin on behalf of EWA stated that EPA is proposing only to monitor the groundwater and impose restrictions on its future use (Alternative 2). There will be no efforts to treat the groundwater or attack this contamination. Alternative 2 has a 30-year estimated cost of approximately $5.7 million, which is the least costly option by a very wide margin. Alternative 3a, which is next in the cost ranking, has an estimated 30-year cost of approximately $17.4 million. The Proposed Plan does not state what happens after 30 years, when, based upon the lack of an active response action under Alternative 2, little change can be anticipated.

Response: Please refer to the response to Comment 2.1.4 regarding how EPA uses 30 years as a default value for cost estimating purposes. EPA expects that the monitoring required under Alternative 2 will be required far longer than 30 years, but also expects that that would be the case for any alternative, as the active remedies would have little effect on the overall groundwater conditions. The 30-year time period is discussed in three places in the Proposed Plan, and in each case, EPA identifies it as no more than a cost estimating default assumption.

2.1.6: R.W. Chapin on behalf of EWA stated that EPA is basing its recommendation to waive ARARs due to Technical Impracticability on an assessment of TCE contamination found within the fractured, sedimentary bedrock that makes up OU3. EPA states that the majority of the mass of TCE [and other VOCs] resides within the rock itself and that mass will slowly leach out "forever." EPA also states there is no practical means to "get at" the TCE.

Response: Yes, this is an adequate summary of EPA's findings. EPA expects to revisit this assessment in future Five-Year Reviews of the groundwater. This review will consider whether new technologies have been developed that might aid in addressing the groundwater.

2.1.7: R.W. Chapin on behalf of EWA stated that the Proposed Plan for Cornell-Dubilier groundwater is not based on a firm technical basis. The characterization of the groundwater system is not consistent with known conditions in the Passaic Formation. The Proposed Plan essentially, *is* to do nothing to address significant groundwater contamination. EPA plans nothing other than to monitor it and allow the Park Avenue potable drinking water wells to remove it.

Response: This comment is restated with more specifics in other comments from the same commenter (for example, please refer to the response to Comment 1.2.9). EPA has concluded that the site is, at most, one of several sources of TCE and 1,2-cDCE to the Park Avenue wellfield influent, but please see EPA's response to comment 1.3.5 regarding other sites that may be affecting public water. As EPA has explained, EPA has not conclusively determined whether groundwater contamination from the CDE site is even reaching the Park Avenue wellfield.

2.1.8: A commenter noted that Superfund requires the consideration of State requirements under the Applicable or Relevant and Appropriate Requirements (ARARS). New Jersey classifies, sets standards, and regulates groundwater as potable water supply, even in aquifers with no current active drinking water use. The proposed remedy did not fully consider these New Jersey ARARs for groundwater and would essentially condemn a potable water supply for future use.

Response: This action does not ignore State ARARs. Please refer to the Feasibility Study Report (FS Report) for a discussion of identified ARARs, including New Jersey ARARs, that are being waived under this action.

2.1.9: Given the loss of use of the groundwater, a commenter requested that EPA find federal partners to explore "Natural Resource Injury" and damage compensation.

Response: EPA is barred from using the Superfund to pursue Natural Resource Damages on behalf of Federal or State Trustees. The State of New Jersey is the Natural Resource Trustee for the groundwater. The PRPs for this site are well known.

2.1.10: R.W. Chapin on behalf of EWA stated that the selected Proposed Plan is equivalent to the “No Action” alternative: under Superfund the EPA is required to consider the effects of a “No Action’ alternative, which is defined as taking no action to reduce the toxicity, mobility or volume of contaminated groundwater. The only proposed action is to monitor groundwater quality for 30 years and implement institutional controls, i.e., prohibit new groundwater use. As a practical matter, it is very doubtful that the NJDEP would issue a water use permit for any new well is this area. Consequently, EPA has essentially selected no action for a significant groundwater contamination problem that is directly and actively impacting major potable water supplies. The EPA must to inform the public that they are actually doing nothing.

Response: The Agency has been very clear in explaining that the selected remedy includes no active remediation, and the reasons why. The actions planned by EPA are selected to prevent exposure to potential receptors. Extensive sampling, monitoring and evaluation of the groundwater plume over time will be conducted as part of the selected remedy, including the installation of additional wells, whereas, none of these activities would occur in the “No Action” remedy.

2.1.11: R.W. Chapin on behalf of EWA stated that the contaminated groundwater discharging into the Bound Brook must be addressed now: EPA has decided to allow the contaminated groundwater to continue to discharge into the Bound Brook while the OU4 work is ongoing. Historic pumping of the Spring Lake wells prevented the discharge into the Bound Brook. The Bound Brook is a critical receptor due to its recreational use and aquatic resources. What are the impacts of this ongoing discharge? EPA should include control of contaminated groundwater discharge in its plan for OU3. Delaying will be detrimental to the Bound Brook.

Response: The stretch of the Bound Brook where contaminated groundwater recharge is most likely to occur includes some of the most highly PCB-contaminated areas identified. As stated in the Proposed Plan and the Decision Summary in EPA's Record of Decision, EPA's additional evaluations for groundwater-to-surface water are intended to address the potential for further PCB releases that might occur after a PCB remedy had been implemented in the Bound Brook. Other exposure scenarios (such as exposures to VOCs) will be considered, but the primary concern is the potential for PCB releases.

2.1.12: R.W. Chapin on behalf of EWA proposed a response action, "Interim Pump and Treat with Quantification of Bedrock Contaminant Load."

"Simply put, we do not know the mass of contamination present or how that mass will respond if it is "stressed". The modeling assumes a slow steady diffusion out of the bedrock for a long time, but this is based on assumed mass transfer parameters.

"At the same time, continued discharge of contaminated groundwater is the Bound Brook will occur for several years, at least, while investigations are complete and alternative remedies are evaluated. Action should be taken sooner.

"Historically, the Spring Lake wells acted as an effective pumping system that prevented the discharge to the Bound Brook. Those wells [are] still in place, or the infrastructure of a recovery system essentially still exists. The capital expenditures required to use it as a recovery system should not be large.

"Utilizing the Spring Lake wells to recover contaminated groundwater to prevent discharge to the Bound Brook should be

implemented now. At the same time, the monitoring program of the [Proposed Plan] should be modified such that [it] provides data on the key question, which is: what is the rate of [chlorinated VOC] movement out of the bedrock? This is the only way to truly know if those predictions are accurate.

"It is recommended that this interim remedial measure be applied for a 3-year period. By that time the OU-4 work should be complete."

Response: Please refer to responses to Comments 2.1.1 and 1.3.6. If EPA were to undertake an action now with the sole purpose of preventing groundwater releases to the Brook, the Proposed Plan already notes that this could be accomplished with a relatively small local pumping system. There would be no need to undertake a massive pumping effort at a distance of 1,500 feet, such as would be involved if the Spring Lake wellfield were reactivated. When this wellfield was operating (resulting in the lowered water table noted above), it was withdrawing one to two million gallons per day.

Moreover, EPA has not reviewed the functionality of the Spring Lake wellfield with MWC. This wellfield was reportedly closed by MWC as a business decision due to the presence of VOCs and perchlorate. The treatment system in use at the Spring Lake wellfield when it was active was reportedly capable of removing the VOCs to the drinking water standards, but the treatment system was reportedly not upgraded to remove the perchlorate. Therefore, activating the Spring Lake wells would not be possible without a complete engineering evaluation of the pumping and treatment systems and upgrades to the treatment system would likely be required. By the time these tasks could be undertaken, the OU4 study, including risk assessments, will have been completed. EPA will determine whether there is any need for remedial action due to discharge of groundwater to Bound Brook based on those risk assessments.

Subpart 3: Other Comments

3.1.1: A commenter, writing for himself and several neighbors, noted that residential basement flooding had become more prevalent in recent years in his neighborhood, possibly associated with the closure of the Spring Lake wellfield. Shutting down the wellfield caused a rise in the water table in nearby monitoring wells, as noted in EPA's RI/FS. The commenter asked for a survey of basement sump pump activity, basement flooding, and "soil water-logging issues" in South Plainfield over the past 20 years, to help determine if the cause of recent basement flooding could be tied to the discontinuation of pumping at Spring Lake.

Response: The neighborhood identified by the commenter is not within the OU3 study area. The RI did note a rise in the water table from 2002, when it was measured in a series of shallow bedrock monitoring wells at the site, to 2008, when new water level measurements indicated water table rise of as much as five feet. The RI attributes this change to the decision by MWC to stop using the Spring Lake wellfield (the last well was turned off in 2003). Note that the RI also indicates that the water table, measured within the OU3 study area, is typically found 20 to as much as 40 feet below ground surface, which is not a depth where basement flooding would occur even with a water table rise of five feet. EPA cannot extrapolate these measured water table levels, or the affects of the Spring Lake wellfield pumping, to areas beyond the limits of its study area. The issue of basement flooding outside of the OU3 study area is beyond the scope of EPA's investigation.

3.1.2: A commenter asked that EPA investigate other sites in the area, including the former Chevron-Ortho plant on Metuchen Road, and a "former dump site" where houses were subsequently built in South Plainfield.

Response: The "other sites" identified by the comment were outside the area of OU3 and are not associated with the CDE NPL site. These sites are beyond the scope of EPA's investigation.

II.b Oral Comments from the Public Meeting, August 7, 2012

A summary of the comments and questions from the public meeting transcript can be found below. The original transcript is an attachment to this Responsiveness Summary.

Oral 1: What was the highest concentration [of VOCs] found in the shallow aquifer? What is the groundwater standard for TCE? A separate comment asked about TCE concentrations at depth, ("200 feet down").

Response: The NJDEP groundwater standard is 1 ug/L for TCE and 70 ug/L for cDCE. The highest concentrations of TCE and cDCE found in shallow wells were from wells on the CDE facility, with a maximum detected concentration of 23,000 ug/L for TCE and 53,000 ug/L for cDCE (see RI figures 5-11 and 5-12).

Please refer to RI Figure 5-17 for a summary of TCE data at approximately 200 feet below ground surface (200 feet bgs).

Oral 2: What was the highest concentration of PCBs found in groundwater?

Response: Please refer to Section 5.6 of the RI Report for a summary of the nature and extent of PCB contamination.

Oral 3: As part of its presentation about the bedrock, EPA passed around rock core samples taken from the Passaic Formation. A meeting attendee asked if the rock core samples were contaminated.

Response: No.

Oral 4: EPA stated that the groundwater is not expected to recover for hundreds of years, centuries. What is the basis for centuries? More specifically, in its presentation and in the Proposed Plan, EPA indicated that VOC contaminant mass trapped in the rock would take centuries to diffuse out of the rock. How did EPA compute that the mass that was in the rock would take centuries to diffuse out?

Response: Please refer to the groundwater modeling sections of the RI and the TIER. The public meeting presentation described several site phenomena, namely: that there is a large volume disparity between pore water and fracture water; that nearly all the contaminant mass is in the rock matrix and not the fractures; and that the “clean up” of the pore water is limited by rate of diffusion back out of the pore water into the fractures.

Oral 5: A commenter asked whether EPA’s groundwater model was the correct model for this aquifer, and whether EPA had validated the model.

Response: Please refer to the responses to Comments 1.2.8, 1.2.10, 1.2.11 and 1.3.2.

Oral 6: Has EPA received calls from residents outside of the OU3 study area to discuss potential site-related contaminants that might have been detected in a private drinking water well?

Response: Over the years, EPA has received such inquiries and has either tested private wells or referred the inquirer to NJDEP. EPA has not tested any private drinking water wells that have shown exceedances of promulgated standards.

Oral 7: To identify potential private wells, EPA should cross-reference actual addresses with locations that do not receive water bills. Wouldn't the water company Middlesex Water Company be able to provide this data? Is it public information? To EPA's knowledge, have all existing private wells been identified?

Response: EPA did consult with MWC in an attempt to cross-reference addresses with places that did not receive a water bill. This effort did not yield any new leads.

EPA has visited every location identified to the Agency. We are not satisfied that we have identified all wells yet. As described in the Proposed Plan, EPA will continue these efforts to help prevent exposure through use of private wells.

Oral 8: A resident asked if exposure to VOCs could occur through showering, or only from drinking water.

Response: Yes, showering is a plausible exposure route, if using a private well within the TI zone.

Oral 9: How many homes did EPA test for vapor intrusion?

Response: EPA went door-to-door in several neighborhoods in South Plainfield where monitoring well data suggested the possibility of shallow groundwater contamination that could lead to a vapor intrusion concern. 25 homeowners accepted EPA's offer (out of roughly 120 addresses canvased) to perform vapor intrusion testing.

Oral 10: EPA indicated that one tested location had tetrachloroethylene (PCE) in the subslab, but it was not a site-related contaminant. Was PCE detected at the Cornell site?

Response: PCE was not identified as a contaminant of concern at the site, though it was infrequently detected across the OU3 monitoring well network (27 detections among 465 VOC sample events). Most detections were in the range of 1 to 4 ug/L, with a single anomalous detection, 1,600 ug/L, in shallow on-site well MW-06, from the October 2009 sampling event. PCE in MW-06 was 110 ug/L in the March 2010 sampling event.

Oral 11: Several commenters were concerned that EPA would make a remedy decision for the groundwater without understanding whether or not contaminated groundwater is discharging into the Bound Brook. These commenters stated that since EPA is collecting additional information this summer (a subject discussed at the public meeting), EPA should wait to select the groundwater action until it has these results and fully understands the groundwater issues.

Response: EPA agrees with this assessment, and has deferred selection of a remedy for the portion of the groundwater that may be affecting the Bound Brook. EPA will revisit this portion of the groundwater as part of the OU4 remedy for the Bound Brook.

Oral 12: A commenter noted that EPA had been working on the CDE site for 20 or more years, and now EPA was proposing to "do nothing" for another 30 years.

Response: EPA began removal actions at the site in 1997. EPA began remedial work at residential and commercial properties in 2005, and in 2007, EPA began remedial work at the former CDE facility, which included demolishing the buildings and excavating the highly contaminated soil and debris. So far, EPA and the State have spent over $100 million remediating the site. The RI/FS that led to the OU3 Proposed Plan was started in 2008. Please refer to response to Comment 2.1.4, explaining how EPA uses a 30-year timeframe for cost estimating.

Oral 13: A commenter noted that TCE and other VOC constituents are soluble in groundwater and are, therefore, mobile. This mobility should make them available for removal and a threat to future movement and further contamination.

Response: TCE and cDCE are generally mobile in groundwater, though the RI concludes that these constituents have limited mobility within the fractured rock aquifer at the site since nearly all the contaminant mass is in the rock matrix and not the fractures. The "clean up" of the pore water is limited by rate of diffusion back out of the pore water into the fractures, which severely limits the available treatment technologies.

Oral 14: A commenter asked if EPA had considered “hydrofracking” or similar processes to try and break up some of these rock formations to make it easier to extract the chemicals or pump them out, similar to the way these technologies are used for natural gas. EPA must have experts in special technologies that could be brought in to solve this problem.

Response: The FS did not consider environmental fracturing. Hydraulic, pneumatic or blasting techniques have been used, with limited success, at some remediation projects, to expand the interconnections between fractures and make it easier to either pump contaminated water out, or introduce treatment chemicals into an aquifer. These technologies are generally not applied in densely settled areas due to potential for uncontrolled releases after fracturing, threats to building foundations, utilities, and similar insurmountable risks.

Moreover, environmental fracturing only improves the “secondary porosity” of a formation like the Passaic, by enhancing the interconnectivity of the fracture network and improving the flow of groundwater through the unit. The secondary, or fracture porosity of the Passaic Formation is already relatively high, so that the fractures area highly interconnected and produce a lot of water. It is the primary porosity of the formation – the interconnectivity of the pore spaces in the rock itself, independent of the fractures – that is low, and it would not be measurably changed by environmental fracturing.

The Agency does have a network of experts in different fields, including experts in addressing difficult groundwater sites such as this one. The process for reaching a determination of technical impracticability also requires an additional evaluation process (the Technical Impracticability Evaluation Report) and a separate consultation with EPA Headquarters to assure conformity with the technical and legal requirements for a waiver of ARARs.

Oral 15: A commenter asked a series of questions, attempting to put this site into perspective with other groundwater sites, including whether this was the largest contaminant plume that the EPA officials were familiar with, whether the Agency had ever not taken action for a plume of this size, and whether other sites in New Jersey had also received TI waivers.

Furthermore, the commenter asked whether the other sites (with large groundwater plumes) were in communities as densely populated as South Plainfield.

Response: This is not the largest contaminant plume, even in New Jersey, and it is not the largest for which a TI waiver has been issued. At the meeting, the EPA officials named several nearby NPL sites for which ARAR waivers had previously been issued (e.g., Chemical Insecticide Corporation site, Horseshoe Road site). The Federal Creosote site is also a nearby NPL site for which an ARAR waiver was issued. Particularly in the absence of any evidence of vapor intrusion, the population density residing above a contaminant plume is not particularly significant to selecting a groundwater remedy, except insofar as it limits some of the cleanup options available (e.g., at Federal Creosote).

Oral 16: A commenter observed that groundwater is discharging to Spring Lake, and asked if groundwater was a potential source of the PCBs found in Spring Lake.

Response: EPA has collected sediment, surface water and biota (fish) data from Spring Lake, and from the neighboring tributary (Cedar Brook), as part of the OU4 Bound Brook study. Details will be presented in the OU4 study (planned for completion in 2013). Page 4-10 of the OU3 RI Report states "To the northeast of the former CDE facility, immediately across Bound Brook, groundwater movement in the shallow water bearing zone is generally toward the west, with groundwater discharging to Bound Brook, Cedar Brook and Spring Lake." However, the nearest wells to Spring Lake do not contain PCBs, so groundwater is not a likely source of PCBs that might be identified in Spring Lake as part of the upcoming OU4 RI.

Oral 17: A commenter asked whether EPA had collected enough rock core data to represent such a large area (only four sample points over 800 acres), or whether EPA may be extrapolating the data beyond what was appropriate for what seemed to be a small data set.

Response: Please refer to response to Comment 1.3.3.

Oral 18: Regarding Bound Brook, a commenter asked whether EPA had identified specific areas where there are seeps (discharges) entering the brook.

Response: Please refer to response to Comment 1.1.2. From water level and stream flow measurements, EPA has developed an understanding of the stretch of the Brook where there may be a discharge of contaminated groundwater, and it is in this zone that additional testing is taking place.

Oral 19: Also regarding Bound Brook, a commenter asked how many chemicals of concern are in the groundwater in the shallow zone that might discharge to the Brook, and whether those chemicals were carcinogenic or noncarcinogenic.

Response: Please refer to the OU3 Baseline Human Health Risk Assessment (BHRRA), in the Administrative Record, for a full list of contaminants of concern (COCs) found in groundwater. The primary COCs for groundwater are TCE, cDCE and PCBs. However, the Bound Brook study will include a separate BHRRA that considers exposures that might occur with the Bound Brook, so the potential constituents of concern may change.

Oral 20: A commenter noted that TCE affects the mobility of PCBs, and asked whether that increased mobility ultimately have an influence on the ability of PCBs to get into the food chain. Can PCBs be picked up by plants and consumed by animals and deer on site? A second commenter asked what other environmental impacts there were, like the consequences of trees pulling up TCE through their root systems, or affects on other wildlife.

Response: VOCs and PCBs in groundwater do not have a means of entering the food chain. Potential ecological exposures will be examined in the context of the Bound Brook (OU4) RI/FS, as PCBs carried to surface water (possibly through enhanced mobility from TCE) could enter the food chain or otherwise affect ecological receptors. As discussed in the Proposed Plan, VOCs will not remain in surface water for any length of time, and TCE cosolvency would no longer be at issue.

Oral 21: If EPA's preferred remedy is selected, does it lock EPA down into essentially doing nothing for the next 30 years? If significant changes in technology were to allow for a meaningful groundwater cleanup, can EPA revisit its decision?

Response: In addition to the regular monitoring program, the groundwater would be subject to EPA's Five-Year Review process, and EPA typically reassesses available remedial technologies every five years to determine whether the technical impracticability determination is still valid.

Oral 22: A commenter asked about the effects that an ARARs waiver and institutional controls on groundwater use might have on property owners above the area of groundwater contamination. Would there be a deed restriction or other land-use constraint on properties? If someone is prohibited from using water that is under their property, can they be compensated? Since the Cornell-Dubilier site is the direct reason they can't have a well on their property, would a property owner have an enforcement case against CDE? Do property owners have the right to well water?

Response: EPA is invoking an ARAR waiver, which will waive federal and state standards that would otherwise apply to the groundwater, in response to the technical impracticability of cleaning up the groundwater sufficiently so that it could be used for drinking water. Institutional controls are needed to ensure that the public is on notice that the groundwater cannot be cleaned up to meet these standards, and to restrict the use of the groundwater in order to limit exposure to the contaminants. In other words, the institutional controls will limit use of private wells, not constrain the use of the land. Whether a property owner has a right to use groundwater, and/or restrictions on any such rights, are legal questions based largely on New Jersey law, and beyond the scope of EPA's remedy selection process.

Oral 23: A commenter asked if EPA (or others) had studied the matrix diffusion phenomenon at the level it did here at other places in New Jersey or elsewhere in the Passaic. In addition, the commenter asked for other examples in New Jersey of granting an ARARs waiver for technical impracticability, and what were the reasons for granting the other TI waivers.

Response: EPA’s understanding of the effects of matrix diffusion derives, in part, from its experience with pump-and-treat remedies at multiple sites at which this technology failed to perform as predicted. This is the most comprehensive matrix diffusion investigation at an NPL site in Region 2, and probably in the Passaic Formation, though there are a number of other valuable studies within the Newark Basin that have contributed to EPA’s understanding of matrix diffusion. In September 2012, Region 2 issued a groundwater ROD for the White Chemical Corporation, where matrix diffusion had also led to a waiver of ARARs in a bedrock aquifer. At the Public Meeting, EPA officials identified several other New Jersey NPL sites for which ARAR waivers were selected as components of the remedy.

Oral 24: A commenter asked a series of questions about the tests EPA performed during the RI, and the computer models that EPA was relying on to predict the fate of the contaminant plume in the future.

Response: This discussion, beginning on page 99 through 108 of the public meeting transcript, derives from a series of written comments from R.W. Chapin on behalf of EWA. Please refer to responses to Comments 1.2.7 to 1.2.11, and Comments 1.3.2 to 1.3.5.

Oral 25: A commenter questioned the use of two words in EPA's presentation: was EPA speaking about "absorption" or "adsorption" by the rock matrix? The commenter stated that, if "absorption" were occurring into the liquid in the rock (the pore water), then contaminants would be free to come out of the rock matrix again, given the proper concentration gradient, but if it were "adsorption" to the solid rock surface itself, then it would not come back out of the rock formation at all. Whether it is "adsorbed" or "absorbed" makes a big difference, and EPA does not appear to understand which phenomenon is taking place. The commenter also noted that if "adsorption" were taking place, then there should be no back diffusion parameter in the groundwater model, because the VOCs would be bound up in the rock matrix forever. The commenter indicated that EPA should have run the model under that scenario, to determine a cleanup timeframe.

Response: The commenter subsequently submitted this comment in written form. See response to Comment 1.2.14.

The groundwater modeling did not evaluate a scenario without back diffusion because it is not a plausible current or future site condition.

Oral 26: A commenter asked about the types of wells within the proposed TI zone, including private (residential) wells, wells owned by businesses, and borough-owned wells. Are there any borough-owned wells in the TI zone?

Response: Yes.

Oral 27: Are the borough-owned wells still in use, and are the conditions in these wells a matter of public record?

Response: Yes, there are four wells currently in use for nonpotable purposes. One well is used to fill the municipal swimming pool, and three are used to irrigate athletic fields. EPA has tested all the wells, and TCE was detected. EPA’s conclusion that use of these wells for nonpotable purposes does not pose an unacceptable risk to potential receptors has been shared with the Borough and is included in the Administrative Record.

Please note that EPA has also tested the municipal swimming pool water and did not detect any VOCs.

Oral 28: A commenter asked about flooding, for instance, the flooding from last year's hurricane, where residential basements were flooded. Is there a possibility of site contaminants being picked up in these flooding occurrences? If there were a massive rainstorm, is there the possibility of PCB contaminants being picked up in the sediment and moved around?

Response: The water table is typically at least 20 feet below ground surface, so groundwater contaminants will not reach the surface as a result of heavy rain and be moved about during flooding events. As a separate matter, it is possible for heavy rainstorms to transport contaminated sediments within the Bound Brook corridor, and EPA’s OU4 investigation is evaluating the degree to which this is a concern at the site.

Oral 29: Will there be moratorium on drilling new wells? What about the public water supply wells at Spring Lake Park? If the water company decides to turn the wells back on and is willing to pay for treating the water, would EPA prevent it?

Response: As part of the preferred remedy, EPA would place institutional controls on the area of the plume to prevent the installation of new wells. Middlesex Water Company (MWC) has said to EPA that they have no plans to restart those wells; if MWC wished to do so, it would be possible, with proper treatment, to restart the wells and safely use the treated water. EPA and NJDEP would need to be consulted before use of the Spring Lake wellfield could begin again.

Oral 30: A commenter asked for a clarification about the remediation timeframe and cost for Alternative 3 (hydraulic containment) and Alternative 4 (thermal treatment).

Response: The costs are identified in the Proposed Plan, and there are more detailed cost estimates in the FS Report. The timeframe for implementing Alternative 4, even the more comprehensive Alternative 4b, is three years.

The time to construct Alternative 3a or 3b is approximately one year. Because the goal of this alternative is containment rather than restoration, the timeframe is open-ended: hydraulic containment can only be maintained for as long as the system is in operation.

Oral 31: The same commenter continued. At what cost would EPA expect to see any improvement at all to the environment, to the site or is that not a goal?

Response: Aquifer restoration is typically a remedial goal of the Superfund program. For this case, EPA has concluded that no remedial measures are currently available that would restore the aquifer. Furthermore, while some mass removal would occur through Alternative 4 (and, to a negligible degree, for Alternative 3), no measureable improvement would result from these actions. EPA's benchmark for "measurable improvement" was evidence that some part of the aquifer showed the promise of restoration to drinking water standards within a reasonable timeframe (for example, within 100 years).

Oral 32: Can the Borough, or residents petition EPA to change the remedy or is it only EPA that decides that there is new technology that may be beneficial? Specifically, who controls the reopening of the process at some future time if EPA selects the preferred alternative?

Response: When EPA selects a response action that will leave contamination on site in excess of unrestricted use criteria, EPA reviews the remedy every five years to determine if conditions have changed, including, in the case of TI waivers, whether new technologies have become available. EPA solicits public input at the time of the Five-Year Review.

Oral 33: If a community member is using the water company water and you are going about your daily life, what are the risks, if any, to your average resident in town?

Response: There is no risk to South Plainfield residents associated with using municipal water. The risks to human health evaluated in the risk assessment for OU3 associated with the contaminated groundwater would arise due to exposure to untreated contaminated groundwater. For example, a resident with a private well for potable water could be exposed. The only other potential exposure would be through vapor intrusion, which EPA has not identified as a complete exposure pathway.

Oral 34: What are the risks from vapors from the contaminated groundwater?

Response: The cancer and noncancer health threats posed by exposure to chlorinated solvent vapors are discussed in the BHHRA. Please remember that EPA has not identified any homes where vapor intrusion is an issue.

Oral 35: Is money for the cleanup coming from the original property owners?

Response: EPA has recovered some of its past response costs from potentially responsible parties, but only a small amount when compared to the costs of implementing the OU1 and OU2 remedies. EPA's enforcement efforts are ongoing. State and federal funds, along with funds recovered through settlements of past enforcement actions, are being used to perform the remedies.

Oral 36: A commenter noted that EPA had tested 25 homes for vapor intrusion, but the actual number of homes in the area targeted was much higher. Why isn't EPA testing every single home in that area for vapor intrusion using a Summa canister?

Response: The area targeted by EPA is the area where VOCs were detected in shallow groundwater. EPA went door-to-door in these blocks, an area of roughly 120 homes and businesses, to offer vapor intrusion testing. An acceptance rate of about 25 percent is typical of this type of canvassing effort.

The commenter recommended that EPA place Summa canisters, an indoor air sampler, in every home, which is a standard method of collecting an indoor air sample. EPA does not consider an indoor air sample alone to be an adequate method of assessing the potential for vapor intrusion, because many common household products (e.g., cleaning or pest-control products) contain vapors that can also be collected in a sample, including the same vapors that EPA may be screening for from below the subslab of the basement.

While no site-related indoor air concerns have been identified, the selected remedy includes ongoing vapor intrusion testing as part of the long-term monitoring program.

Oral 37: A commenter asked if EPA had compared groundwater contamination at this site with the contamination in groundwater plume and groundwater investigation and pilot studies that have been done in Raritan Center in Edison, New Jersey, as part of Raritan Arsenal cleanup.

Response: EPA has a robust process for screening potential remedial technologies and cleanup methods as part of the Feasibility Study, in this case focusing on other groundwater projects within the Newark Basin or other similar bedrock aquifers. The Former Raritan Arsenal is a "Formerly Used Defense Site" cleanup managed by the U.S. Army Corps of Engineers. The commenter is referring to the 165 Fieldcrest Avenue and Area 18A pilot studies performed at the facility to evaluate groundwater treatment options for TCE. One of the pilot studies evaluated chemical oxidation, and the other, *in-situ* bioaugmentation, both technologies considered in the CDE Feasibility Study. The facility is within the Newark Basin; however, please note that the pilot studies were performed in shallow soils with an underlying clay confining unit, with no connection to the deeper bedrock, and these studies are not a useful comparison to the CDE groundwater.

Oral 38: A commenter asked for more specifics as to the sampling that EPA would perform moving forward under the Preferred Alternative. Will results be reported back to the residents of the Borough? How frequently will the monitoring occur?

Response: EPA would rely primarily on groundwater monitoring, collected from existing wells and, as discussed in the RI Report, several additional groundwater monitoring points that are likely needed. The Agency also proposes additional vapor intrusion investigations.

EPA is prepared to report its findings to the community. EPA may establish an internet-based approach to providing information to the community. The frequency and other details of the monitoring will be determined in a site-specific long-term monitoring plan.

Oral 39: A commenter asked how important the public's comments would be, as compared to other factors, such as cost.

Response: CERCLA directs EPA to compare remedial alternatives using nine criteria, including community acceptance and cost. Both are important. EPA can only select a remedial action if it is cost-effective, provided that it satisfies the threshold requirements of being protective of human health and the environment, and compliance with ARARS unless a specific ARAR is waived. Consistent with the requirements of the Superfund implementing regulations in the National Contingency Plan, a remedy is cost effective if its costs are proportional to its overall effectiveness.

Oral 40: A resident stated that public water supply wells have influenced the movement of contaminants by extracting groundwater from the area, and suggested that there might be a moratorium on the water company extracting water from the aquifer, which may help mitigate the problem.

Response: Based on the results of the RI, EPA does not anticipate that the contaminant mass will migrate further. Please refer to responses to Comments 1.2.2 and Oral 13.

Oral 41: A commenter asked for clarification about Alternative 3 (hydraulic containment); EPA suggested that if a pumping remedy were started and then later stopped, it is likely that the area would be recontaminated. Is that correct? Would a pump and treat action remove anything from the aquifer?

Response: Hydraulic containment (Alternative 3a or 3b) would prevent VOCs in the fracture water from migrating outside the pumped zone, but would only remove a negligible amount of the mass within the pumped zone, because most of the mass is trapped in the pore water. If the extraction system is discontinued after a period of operation (even, say, 30 years) the reservoir of VOCs still residing in the pore water is expected to recontaminate the fracture water within a relatively short period of time (e.g., months) to a level similar to what was found at the start.

Oral 42: A commenter suggested that at least doing a pump and treat action would be doing “something” until better remedial options come along. Another commenter stated that EPA’s primary motivation for not doing “something” was cost.

Response: As set forth in the National Contingency Plan, the threshold criteria considered by EPA when selected a remedy are overall protection of human health and the environment, and compliance with ARARs. The balancing criteria are long-term effectiveness and permanence, reduction of toxicity, mobility or volume through treatment, short-term effectiveness, implementability and cost; and the modifying criteria are state and community acceptance.

EPA evaluated the remedial alternative consistent with the criteria. While cost is not ignored in the analysis, it is not a primary criterion or goal. As explained in response to Comments 2.1.3 and Oral 31, EPA has concluded that a pump and treat action would not result in meeting the federal and state drinking water standards, and would in fact remove only a negligible amount of TCE from the bedrock. Therefore, it would not be cost-effective to construct and operate a pump and treat system.

Oral 43: A commenter suggested that EPA was in danger (for political reasons), and that EPA cannot be expected to even exist a year, five years, 30 years down the road. In that case, no one would be around to protect the community from this residual contamination.

Response: EPA's investigation and remedy selection process are set forth in the Superfund law and its implementing regulations, as well as EPA guidance documents. It is beyond the scope if the remedy selection process for EPA to speculate about how political considerations might affect the future of the Agency, and funding that may or may not be available to carry out the monitoring. EPA is presenting findings in 2012 for an environmental problem that is understood to have begun as early as the 1930s. The monitoring and institutional controls called for by the remedy will protect community members by establishing a public record of the existence of the groundwater conditions.

Oral 44: A commenter, referring to Alternative 3 or 4, asked if EPA was really stating that removing the source isn't going to help in some fashion. Won't removing the source eventually help the groundwater conditions improve?

Response: EPA has already removed the primary ongoing source of groundwater contamination as part of the $80 million OU2 source control remedy. Alternative 3 would remove a negligible amount of mass. Alternative 4 has the potential to remove contaminant mass from the bedrock but would face a large number of implementation challenges, as discussed in the FS and the Administrative Record. EPA's computer modeling allowed EPA to conclude that neither of these alternatives, even if 100 percent successful, would improve groundwater conditions such that any part of the aquifer would meet ARARs within a reasonable timeframe (in this case, 150 years).

Oral 45: Did EPA determine a timeframe for pump and treat to clean up the aquifer? Did EPA run that version of the model?

Response: No. EPA determined that that is not a feasible scenario at this site.

ATTACHMENT A
Proposed Plan

Superfund Program
Proposed Plan

U.S. Environmental Protection Agency
Region 2

Cornell-Dubilier Electronics Superfund Site

South Plainfield, New Jersey

July 2012

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the Preferred Alternative to address the contaminated groundwater at the Cornell-Dubilier Electronics (CDE) Superfund site. In addition, this Plan includes summaries of cleanup alternatives evaluated for use at the site. This Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA), the lead agency for the site, in consultation with the New Jersey Department of Environmental Protection (NJDEP), the support agency. EPA, in consultation with NJDEP, will select a final remedy for contaminated groundwater at the site after reviewing and considering all information submitted during the 30-day public comment period. EPA, in consultation with NJDEP, may modify the Preferred Alternative or select another response action presented in this Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan.

EPA evaluated potential remedies for groundwater and concluded that the characteristics of the site make aquifer restoration technically impracticable. EPA is proposing a remedial strategy that prevents exposure to site groundwater as the Preferred Alternative, discussed below. The Preferred Alternative relies primarily on institutional controls and long-term groundwater monitoring to prevent use of untreated groundwater as a source of potable (drinking) water.

EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund). This Proposed Plan summarizes information that can be found in greater detail in the Remedial Investigation (RI) and Feasibility Study (FS) reports and other documents contained in the Administrative Record file for this site.

MARK YOUR CALENDARS

Public Comment Period
July 20, 2012 to August 20, 2012
EPA will accept written comments on the Proposed Plan during the public comment period.

Public Meeting
August 7, 2012 at 7:00 P.M.
EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at the South Plainfield Senior Center located at 90 Maple Avenue, South Plainfield, New Jersey.

For more information, see the Administrative Record at the following locations:

EPA Records Center, Region 2
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308
Hours: Monday-Friday – 9 A.M. to 5 P.M.

South Plainfield Public Library
2484 Plainfield Avenue
South Plainfield, New Jersey 07080
(908) 754-7885
Please refer to website for hours:
http://www.southplainfield.lib.nj.us/

SITE DESCRIPTION

The CDE site, located on Hamilton Boulevard in South Plainfield Borough, Middlesex County, New Jersey, consists of contamination from a former industrial facility that once operated at that location. The 26-acre vacant lot was occupied by the Cornell-Dubilier Electronics Company from 1936 to approximately 1962. Figure 1 shows the location of the former facility, which is Operable Unit 2 (OU2) of the site.

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Operable Unit 1 (OU1, discussed in more detail below) includes a number of residential and commercial properties near the former facility that were contaminated by site activities.

Figure 2 also shows the extent of Operable Unit 3 (OU3), the subject of this Proposed Plan. The total land area of OU3 encompasses approximately 825 acres, which consists of the observed extent of site-related volatile organic compounds (VOCs) found in groundwater. Polychlorinated biphenyls (PCBs) have also been detected in groundwater, but only in the area of the former CDE facility. Figure 2 also shows a portion of the Bound Brook study area, Operable Unit 4 (OU4) of the site. Figures depicting the scope of the Bound Brook study area can be found in the Administrative Record for the site.

SITE HISTORY

The original facility, a complex that eventually grew to 18 buildings, was built in the early 1900s by Spicer Manufacturing, later known as Dana Corporation, a manufacturer of automobile components. Dana moved its operations to the Midwest in the 1920s and first leased, then sold the facility to CDE. During CDE's occupancy of the site, the company manufactured electronic components including, in particular, capacitors. PCBs and the degreasing solvent trichloroethylene (TCE) were used in the manufacturing process, and the company disposed of PCB- and TCE-contaminated material directly on the facility soils. CDE's activities led to widespread chemical contamination at the facility, as well as migration of contaminants to areas adjacent to the facility. TCE and PCBs have been detected in the groundwater and soils, and the now-demolished on-site buildings were contaminated with PCBs. In addition, PCBs have been found on adjacent residential, commercial, and municipal properties, and in the surface water and sediments of the Bound Brook.

With CDE's departure in 1962 until its closure in 2007, the facility was operated as a rental property, the Hamilton Industrial Park, with over 100 commercial and industrial companies occupying the facility as tenants.

NJDEP performed a site inspection in 1996, collecting a number of environmental samples that were found to contain PCBs. In June 1996, at the request of NJDEP, EPA collected soil, surface water and sediments at the facility, revealing elevated levels of PCBs, VOCs, and metals. In March 1997, EPA ordered the owner of the property, D.S.C. of Newark Enterprises, Inc. (DSC), a potentially responsible party (PRP), to perform a removal action. The removal action included paving driveways and parking areas in the industrial park, installing a security fence, and implementing drainage controls to mitigate risks associated with contaminated soil and surface water runoff from the facility. This work was substantially completed by the fall of 1997.

In 1997, EPA conducted a preliminary investigation of the Bound Brook to evaluate potential contamination from the site. Elevated levels of PCBs were found in fish and sediments of the Bound Brook, leading to an NJDEP-issued fish consumption advisory for the Bound Brook and its tributaries, including nearby New Market Pond and Spring Lake. These advisories remain in effect today.

Also in 1997, EPA tested residential and commercial properties in the blocks nearest the CDE facility. For several of the properties tested, PCBs were found in soil and interior dust that posed a potential health concern for residents of those properties. These investigations led to removal actions at 15 residential properties, conducted from 1998 to 2000.

In July 1998, EPA included the CDE site on the National Priorities List.

OU1 Remedy and Remedial Action

In 2000, as part of the first RI/FS for the site, EPA expanded the off-site investigations by collecting soil and interior dust samples from properties further from the CDE facility. EPA tested individual properties and performed a right-of-way survey that expanded the area tested from the nearest blocks (Hamilton Boulevard, Spicer and Delmore Avenues) in the initial removal action to approximately seven blocks from the facility during the RI. Because PCBs were found in Bound Brook, EPA also expanded the testing to residential areas that bordered the Brook.

The RI sampling found only sporadic detections of PCBs – 807 samples were collected during the RI, with only 25 detections over 1 milligram per kilogram (1 mg/Kg) total PCBs. PCBs were only at shallow depths (generally in the first two feet of soil) suggesting that the PCBs on the nearest properties (addressed by the removal actions) had come from wind-blown dust from the facility. The RI/FS did identify three additional properties with elevated levels of PCBs in soil, and the investigation revealed some areas worthy of further testing.

In September 2003, EPA selected a remedy to address PCB-contaminated soil and interior dust at properties in the vicinity of the former CDE facility, with concurrence from NJDEP. The remedy requires the excavation, off-site transportation and disposal of PCB-contaminated soil, and property restoration. The remedy also calls for interior dust cleaning at properties where PCBs are found indoors.

Using Federal and State funds, EPA began remediating the first OU1 properties in 2005. The Record of Decision (ROD) identified three properties; however, testing identified PCBs on an adjoining lot, and the action was expanded to address that property as well. Approximately 2,300 cubic yards of contaminated soil were excavated from the four properties.

Beginning in 2008, EPA began testing the additional areas identified in the OU1 ROD as needing further testing. This testing has sampled over 60 properties to date, and is nearly complete. Thus far, eight additional properties have been identified, bringing the total to be addressed by the OU1 remedy to 12, as of this date. The cleanup of these additional properties will begin in August 2012 and will take approximately four months to complete. Investigations are still being performed on several additional properties as part of OU1. EPA expects to complete the OU1 property investigations in 2012.

OU2 Remedy and Remedial Action

EPA began the RI/FS for the 26-acre facility in 2001. This investigation included soil and building testing and the installation of groundwater monitoring wells to assess the extent of the groundwater contamination at the site. While a variety of other contaminants of concern were identified, such as lead and arsenic, the primary contaminants of concern (in terms of risk posed and extent) were PCBs and TCE.

PCB-contaminated dust and building materials were found at unacceptable levels in the on-site buildings. Most of the buildings were occupied while EPA was conducting the RI/FS, and EPA advised the property owner and on-site tenants how to minimize the potential for exposure until a remedy could be selected and implemented.

Soil testing was performed in the overburden soils to bedrock, which was encountered as deep as about 15 feet below ground surface (15 feet bgs) in the rear of the facility. Extensive fill areas containing thousands of discarded capacitors were found in the rear, undeveloped portion of the facility property.

In evaluating remedies for the site, EPA identified the Principal Threats posed by the site to be soils and debris contaminated with PCBs in excess of 500 mg/Kg, or TCE in excess of 1 mg/Kg. EPA has developed guidelines for when to identify PCBs as Principal Threats, and TCE was targeted as a potential mobile source of groundwater contamination. The OU2 RI/FS estimated that as much as 115,000 cubic yards of soil and debris exceeded these thresholds. Nearly all of the site soils tested exceeded 10 mg/Kg total PCBs, an EPA cleanup guideline for commercial or industrial reuse.

The OU2 RI/FS also identified extensive groundwater contamination, from both TCE and PCBs, with TCE extending off the former CDE facility property. EPA elected to complete the groundwater investigations as a separate study (this OU3), and address the buildings, soil and debris on the former CDE facility property as a single operable unit (OU2).

On September 30, 2004, EPA issued a ROD for OU2, with concurrence from NJDEP. The remedy included four key components:

- Relocation of the tenants at the Hamilton Industrial Park, demolition of the buildings and removal of the PCB-contaminated building debris for off-site disposal;
- Excavation, for off-site transportation and disposal, of the Capacitor Disposal Area (CDA), an area of debris located in the rear of the facility;
- Excavation of the Principal Threats posed by the site for on-site treatment using low- temperature thermal desorption (LTTD), or off-site disposal for material not amenable to LTTD treatment; and
- Capping of the residual soil contamination to prevent direct contact or off-site migration of contaminants left on site.

Using Federal and State funds, EPA began relocation of the tenants in 2006, and completed the last relocation in the spring of 2007. The OU2 remedy has been performed in phases. The building demolition phase was performed first, allowing access to underlying contaminated soil that needed to be excavated. This work was completed in 2008. The CDA was addressed next, resulting in the removal of approximately 13,700 cubic yards of contaminated debris. The completion of the CDA excavation was followed by a third, and final, phase of the OU2 remedy, LTTD treatment and capping. The OU2 remedial design identified approximately

69,000 cubic yards of soil requiring treatment using LTTD. A mobile LTTD treatment unit was erected on site and, after a startup period when the unit's air emissions control systems were tested to make sure they met performance criteria set by NJDEP, the unit began treating PCB-contaminated soil in November 2009, completing work in February 2011. The LTTD unit treated approximately 65,000 cubic yards of site soils, needing to meet a minimum target of 10 mg/Kg total-PCBs in the treated soils. The unit actually treated the soils to less than 1 mg/Kg. The LTTD unit could not fully treat large debris and most of the capacitors found mixed in with the soil. Approximately 31,000 cubic yards of over-size debris and capacitors were screened out and sent off site for disposal as part of this phase of the cleanup.

The LTTD unit was fully decontaminated and removed from the site in July 2011. The remedy calls for a multilayer cap (e.g., soil and asphalt), and a surface water collection system. The surface water collection system, which is now in place, is installed above the cap so that surface water is collected and removed from the site without encountering residual soil contamination.

OU3 and OU4 Remedial Investigations

The comprehensive OU3 (groundwater) and OU4 (Bound Brook) RIs initially were performed concurrently. The OU3 field studies were completed in 2011, leading to this Proposed Plan. EPA expects to complete the OU4 field work, which includes the testing of over nine miles of the Bound Brook and its tributaries, connected floodplains, and extending into Green Brook, later this year. After completion of the sampling program, EPA will prepare a RI Report and perform human health and ecological risk assessments for OU4, followed by a FS study to evaluate potential remedies. These activities are planned for 2012 and 2013.

SITE CHARACTERISTICS

The discussion below summarizes a few essential features of the highly complex geologic setting found at the site. A better understanding of the site conditions can be found in the RI/FS Reports. To understand the site groundwater, EPA installed 22 monitoring wells, primarily in the Passaic Formation bedrock that is the predominant geologic unit within the study area. Wells were drilled as deep as 600 feet bgs. In addition to sampling groundwater for hazardous substances, EPA performed a series of pumping studies and other standard aquifer tests to understand how fractures in the bedrock aquifer are connected, with the goal of understanding how the groundwater moves. The RI also included rock coring and other sampling techniques to analyze the extent to which contaminants had been adsorbed into the rock itself, a phenomenon called matrix diffusion that is associated with certain rock formations, including the Passaic Formation.

Geology and Hydrogeology

The study area shown on Figure 2 is relatively flat, with surface water (Bound Brook, Cedar Brook and Spring Lake) as primary topographic features. The shallowest subsurface deposits are unconsolidated (loose material - not solid rock), consisting primarily of red-brown silt, sand and clay layers intermixed with urban fill. These deposits are no thicker than 15 feet at the CDE facility but are found as thick as 30 feet in the study area.

Below the overburden is the Passaic Formation, part of an ancient basin of Triassic-Jurassic sedimentary and igneous rocks found across the region. Tests during the RI indicate sedimentary rock (mudstone, siltstone and shale) typical of the Upper Passaic Formation, with numerous fracture zones present in bedrock from its surface to approximately 600 feet bgs, the maximum drilled depth.

The Passaic Formation generally forms a highly interconnected multi-aquifer system that is several hundred feet thick. Groundwater movement is primarily through horizontal and vertical fractures. In some areas, surface water (precipitation or local surface water features) either recharges, or is recharged by, the bedrock groundwater.

Groundwater in fractured sedimentary rock occurs in the pore spaces or "matrix" of the rock and in fractures of the rock; the capacity of a rock to store water is referred to as its "porosity." In the case of sedimentary rock, the porosity of the rock matrix is relatively high (commonly 5 to 20 percent of the rock's volume), because a large volume of water can be stored in the pore spaces of the bedrock. Conversely, the porosity of the rock fractures is relatively low, typically between 0.1 and 0.001 percent of the rock's volume, because a much smaller amount of water can be stored in the fractures. The average fracture aperture size found at the site is 83 microns, or slightly smaller than the thickness of a human hair. The differences in porosity only refer to the total amount of water stored in the rock matrix (pore spaces) and fractures.

Porosity does not correlate to movement of water through the rock matrix or fractures. The "permeability" of a rock formation refers to the degree of interconnectedness of the pore spaces and fractures in a rock, which in turn affects the degree to which groundwater can move through the rock. For the Passaic Formation, the interconnectivity of the pore spaces of the rock matrix is very low, so while a large volume of water is stored in the pore spaces, the permeability of the rock matrix is very low. By contrast, the degree of interconnectedness of the fracture network is high, and this fracture network is considered highly permeable.

Overall, the bedrock matrix has a high porosity (ability to store water) but a low permeability (ability to transmit the stored water). Conversely, the bedrock fractures have a low porosity (ability to store water) but a high permeability (ability to transmit water). This is a general description of most of the encountered bedrock. The shallowest bedrock units are more heavily fractured and weathered, so fractures in the first few feet of the bedrock tend to be larger, with a higher capacity to store water. Also, one pronounced large fracture zone was encountered deeper in the bedrock, at approximately 65 feet bgs at the CDE site, and again at close to 300 feet bgs near Spring Lake (geologic features are often tilted like this so that the same unit encountered at one depth in one location will appear at another depth at a different location). This intensively fractured seam is characterized by significantly larger-than-average fracture apertures, but it is the exception.

Keeping in mind that the portion of the aquifer studied at the site is hydrogeologically interconnected, for ease of discussion, the aquifer is described as three layers: shallow, intermediate, and deep water bearing zones as depicted in Figures 3, 4 and 5. The potentiometric surfaces depicted on these figures indicate the direction of groundwater flow at each of these depths. The shallow water bearing zone extends from ground surface to a depth of approximately 120 feet bgs and is hydraulically connected to Bound Brook, Cedar Brook and Spring Lake. This surface water influence disappears with depth. Groundwater movement in both the intermediate and deep water bearing zones is primarily to the northwest at the former CDE facility and arcs to the north and northeast with increased proximity to the Park Avenue Wellfield (discussed below).

Municipal Pumping History

Units of the Passaic Formation are used as a source of potable water for communities in the study area (Figure 6). Numerous wells tap the formation, with reported pumping rates ranging up to several hundred gallons per minute. Current groundwater pumping influences regional and local groundwater flow direction, and historical pumping of municipal extraction wells has exerted a dominant influence on groundwater movement at the former CDE facility.

All the currently-operating municipal wells in the area are owned and operated by Middlesex Water Company (MWC). MWC has been instrumental in enabling EPA and its consultants to reconstruct a pumping history, by researching its archives and producing records that extend back to the 1950s. The most influential wellfields (shown on Figure 6) affecting site groundwater are (currently) the Park Avenue Wellfield and (formerly) the Spring Lake Wellfield.

Today, Park Avenue pumps at a rate of several million gallons per day, making it the dominant pumping center in the area. The Spring Lake Wellfield is not currently used. It is made up of wells that surround Spring Lake, and began operation in the 1960s. Use of the system decreased in the 1990s, and the last of the wells stopped pumping in 2003. MWC's decision to curtail and then discontinue use of the Spring Lake Wellfield was partly a result of high VOC levels in the wells. (Water from the wellfields is combined at a central distribution center so that it can be treated prior to customer use. Spring Lake also had a second, local treatment system.) While MWC's treatment works could easily remove TCE and other VOCs, MWC elected to use other parts of its pumping network instead. Though dormant, the Spring Lake Wellfield infrastructure is still maintained by MWC and could be used at some time in the future.

When operating, the Spring Lake Wellfield influenced the direction of groundwater movement at the site. A comparison of historical aquifer data measured in 2000 to recent data show a marked change in groundwater elevations and the direction of groundwater movement. The groundwater elevations measured in 2000 were approximately five feet lower than those observed in the recent data. Past groundwater elevations indicated that groundwater movement in the shallow water bearing zone was generally drawn to the northwest by Spring Lake pumping, with surface water from Bound Brook discharging to the groundwater. Current conditions are just the opposite - today, shallow groundwater is likely discharging to Bound Brook.

Since the cessation of pumping at Spring Lake, hydrogeologic conditions at the former CDE facility are influenced by the on-going groundwater withdrawals at the more distant Park Avenue Wellfield.

NATURE AND EXTENT OF CONTAMINATION

Soils from OU2 and DNAPLs

The primary contaminants of concern identified in site soils were TCE and PCBs. (The RI documents the full extent of contaminants detected at the site.) These chemicals were released at the site in large quantities, as evidenced by the extent of the OU2 remedy, which required the excavation and treatment of Principal Threat wastes down to the top of the bedrock surface (approximately 15 feet bgs).

There is strong evidence that TCE and PCBs were released as dense non-aqueous phase liquids (DNAPLs). DNAPLs are among the most persistent contaminants in groundwater. When released into the environment, a DNAPL will flow downward through unsaturated soils and, after encountering groundwater, will also flow downward through saturated porous media, because DNAPLs are denser than water. DNAPLs generally have low water solubility, which, along with other factors, affects the flow properties of the fluid and can lead to pooling. Upon reaching the top of fractured sedimentary rock, the DNAPL will pool in areas of low permeability, eventually migrating downward through more transmissive fracture zones. DNAPL typically penetrates the fracture network, working into ever smaller openings, creating pools, fingers and disconnected droplets of residual contamination.

While site contaminants were released as DNAPLs, there is little evidence of DNAPL remaining at the site. The only detections were near monitoring wells MW-14S and 14D. Depending upon the water solubility of a given chemical, DNAPLs can begin to dissolve into groundwater and move with the groundwater. PCBs cannot, to any significant degree, be spread in a dissolved phase. Thus, while the extent of VOC contamination is wide-spread, the extent of PCBs in groundwater is limited to a few wells nearest the locations of the original PCB releases. Most of the focus of OU3 has been on several VOCs, particularly TCE that can dissolve in water and be carried far from the original release.

The absence of DNAPL is only partly explained by solubility. Over time, most of the DNAPL has been adsorbed into the rock itself, through matrix diffusion.

Rock Matrix Diffusion

Please refer to the text box for a description of the rock matrix diffusion phenomenon. As part of the RI, 465 split rock core samples were collected to assess the extent of rock matrix diffusion at the CDE site. Samples were collected at the highest on-site source areas (Monitoring Well MW-14S and 14D), just off site (MW-16), and near Spring Lake (MW-20).

TCE was the most common VOC present in the rock matrix samples (345 detections among 465 samples), followed by cis-1,2-dichloroethylene (cDCE; 96 detections), and tetrachloroethylene (PCE; 27 detections). The chemical cDCE is a breakdown product of TCE, and PCE is another common industrial solvent, though not one associated with the CDE site. At the MW-14 location, the distribution of the results between 23 and 67 feet bgs indicates that contaminant mass has completely penetrated the matrix blocks between fractures, indicative of very high historic aqueous concentrations, a dense fracture network, and

WHAT IS ROCK MATRIX DIFFUSION?

A highly interconnected fracture network such as the Passaic Formation provides a relatively large surface area for VOCs to sorb onto and then diffuse, or move, into the pore spaces in the rock itself- a process known as matrix diffusion. The pore volume of the rock matrix at the site is nearly two orders of magnitude larger than the fracture network, allowing it to hold the majority of the contaminant mass. Once the VOCs diffuse into the rock, they are left nearly immobile because of the low hydraulic conductivity of the rock matrix.

In the early stages after a release, diffusion into the matrix can slow the advance of the dissolved plume through the fractures. At first, the diffused mass penetrates only a short distance into the bedrock, but in cases with very large initial DNAPL releases (as at the CDE site), matrix diffusion can drive high VOC concentrations until it fully penetrates the matrix block. This effect more commonly occurs in source areas, where aqueous mass concentrations are highest and the residence time is the longest.

After a significant period of time (e.g., 50 years) in the fractured bedrock environment, contaminant mass that has moved into the rock matrix, will be higher in concentration than the groundwater within the fractures. At this point, the process of matrix diffusion will reverse, (this is known as back diffusion), slowly releasing the mass in the rock matrix pore water back to the fractures. Back diffusion occurs slowly over a very long period of time (usually in multi-century timeframe). So while contaminant movement through a bedrock aquifer can be retarded or slowed down by diffusion into the rock matrix, this same process is a major limiting factor in effective remediation due to the slow back diffusion process.

sufficient time to completely diffuse into the matrix. The pore water concentration of TCE in the rock matrix ranged from non-detect to 120,000 micrograms per liter (µg/L) at 33.1 feet bgs. The concentration of cDCE in the rock matrix ranged from non-detect to 330,000 µg/L at 33.1 feet bgs. PCE in the rock matrix ranged from non-detect to 130 µg/L at 75.95 feet bgs.

The results at MW-16 and MW-20 indicate that VOC mass was detected throughout the entire cored interval at each location (to a depth of 250 feet bgs for MW-16 and 412 feet bgs for MW-20). The largest proportion of VOC mass was detected in the 50 to 150 feet bgs depth interval for MW-16, and from approximately 220 to 350 feet bgs for MW-20, with the contaminant mass fully penetrating the matrix blocks between fractures in these intervals. In shallower and deeper sections of these borings, matrix diffusion was less pronounced, but still present. Pore water concentrations were substantially higher in MW-16 than in MW-20. For example, the maximum detected matrix block TCE concentration in MW-16 was 7,800 µg/L at 46.7 feet bgs, and 1,100 µg/L at 295.6 feet bgs in MW-20.

Groundwater

- **Shallow Groundwater (To 120 feet bgs):** The highest VOC concentrations were detected in the bedrock beneath the overburden source area at MW-14S/D, near the center of the former CDE facility, at depths between 23 and 75 feet bgs, with concentrations falling off sharply at depths greater than 75 feet bgs. Figure 3 shows the areal distribution of TCE in the shallow groundwater (TCE, as the most wide-spread site contaminant, is the best representation of the maximum extent of site constituents). The resultant VOC mass in the shallow bedrock has moved to the northwest, consistent with both the observed shallow groundwater gradient, and the historic gradient. Contamination in the shallow water bearing zone is generally limited to the area south of Bound Brook, as the surface water body currently acts as a boundary to shallow groundwater movement; however, elevated concentrations of VOCs in the shallow water bearing zone were detected north of Bound Brook in ERT-4, MW-20, and MW-21. The elevated results at these locations suggest vertical mass transport along steeply dipping fractures, and possibly the influence of historic pumping from the now inactive Spring Lake Wellfield.

- **Intermediate Groundwater (120 to160 feet bgs):** Figure 4 shows the areal distribution of TCE in the intermediate groundwater. The groundwater data show a more northwesterly distribution of contaminants near the former CDE facility, with a northeastward arching path of travel towards the capture zone of the currently operating Park Avenue Wellfield to the north.

- **Deep Groundwater (deeper than 160 feet bgs):** Figure 5 shows the areal distribution of TCE in the deep groundwater. As with the distribution of aqueous mass described in the intermediate water bearing zone, the groundwater data show a more northwesterly distribution of contaminants near the former CDE facility, with a northeastward arching path of travel towards the capture zone of the currently operating Park Avenue Wellfield.

Figure 7 shows a cross-section of VOC concentrations, indicating the downward direction of contaminant migration, generally aligned with the drawdown from municipal pumping wells.

As previously mentioned, a highly transmissive fracture zone intersected several boreholes during the investigation. This fracture zone probably facilitated the down-gradient transport of aqueous mass along a preferential pathway.

The aqueous mass movement has also been influenced by ongoing municipal well withdrawals. Although the general direction of groundwater movement beneath the former CDE facility is to the northwest, the pumping centers to the north and east of the former CDE facility have redirected the groundwater movement and contaminant mass transport. Today, groundwater extraction at the Park Avenue Wellfield is the dominant hydraulic influence on the local hydrogeology.

The influence of the various pumping centers in the area created a highly variable flow direction over time within the fractured rock aquifer. While the direction of groundwater movement may have shifted locally under variable pumping regimes, the general regional gradient was most influenced by the historically most productive wellfield in the area (Park Avenue). In addition, periods of heavy groundwater usage or more localized water extraction (such as at the Spring Lake wells that operated between 1964 and 2003) would have lowered regional groundwater levels, reversing the head relationships between groundwater and surface water.

Other Potential Sources and Effects on Municipal Water Influent

While the site is a significant source of VOCs to groundwater in this area, NJDEP has identified other sources of similar contaminants within or near the study area. EPA's furthest well from the site, MW-23, is approximately 4,000 feet down-gradient of the facility and still contains elevated levels of site-related constituents (e.g., 70 µg/L TCE was detected at approximately 450 feet bgs). Additional monitoring locations are needed beyond this well; however, additional wells to the northeast, the direction of groundwater flow, will be strongly influenced by the local wellfields. While VOCs detected in monitoring wells close to these pumping centers might originate from the CDE site, it is equally likely that they originate from multiple sources.

The influent water entering the MWC treatment works generally has TCE levels in the range of non-detectable to 2 µg/L (the New Jersey drinking water criteria is 1 µg/L). Levels in the treated water are non-detectable. Given the large capture zone of MWC's multiple wellfields, it cannot be determined whether and to what extent contamination from the CDE site is contributing to detectable levels of TCE in the influent water.

Private Well Investigations

Numerous private, industrial, and municipal wells tap the Passaic Formation near the site study area and, as part of the RI, EPA searched for wells in the area that may be in use. Through NJDEP's well registry database and other resources, to date, EPA has identified 40 potential wells within a one-mile radius of the site (31 residential wells and nine wells designated for industrial/municipal - non-drinking - purposes), and has visited each identifiable location. Most of the locations from NJDEP's registry were older private wells (e.g., installed before the 1960s) and EPA was able to determine that the wells no longer existed. EPA identified one private drinking water well, belonging to a home up gradient of the site. Though not within the area of site groundwater contamination, EPA still sampled this well, and found no detectable contamination. EPA also identified four wells used by the Borough and the South Plainfield School District for a variety of purposes, from irrigation to filling the municipal swimming pool. EPA sampled these wells, detecting levels in excess of drinking water standards for TCE. Because these wells were being used for purposes other than drinking water (such as irrigation) EPA evaluated the potential for exposures to users of the facilities where the water was used, and to workers that operated the wells and associated equipment. EPA did not identify unacceptable exposures from the use of these wells, as long as they are not used for drinking water. One of the uses, filling the municipal swimming pool, led EPA to test the pool water at the request of the Borough. The tests, collected just after the pool was filled, did not detect any residual TCE. These results were as expected: TCE, like other VOCs, poses a health threat through consumption (drinking water) or vapor exposure (collecting in an enclosed space like a basement), but quickly evaporates from surface water, alleviating the potential for exposure.

Bound Brook Sediments and Groundwater

The investigation of Bound Brook sediments is not yet complete and is not the subject of this Proposed Plan. Understanding potential threats from contaminated groundwater to surface water (OU4) is a component of the OU4 study. While the OU2 remedy is eliminating the potential for surface transport of contaminants to Bound Brook, the OU3 RI shows strong evidence that upwelling groundwater is discharging to Bound Brook, and shallow wells adjacent to the Brook suggest contaminant discharge to the Brook from groundwater.

TCE that might discharge to surface water would evaporate quickly, and the potential for exposure is minimal. Similarly, the relative insolubility of PCBs limits the potential that discharging groundwater would pose a route of off-site migration for PCBs. In July 2012, as part of the OU4 Bound Brook investigation, seep samplers are being deployed along the creek to measure groundwater discharging to surface water, from which the potential for human or ecological exposure can be determined. The seep sampling will clarify whether this is a plausible transport mechanism.

Vapor Intrusion

VOC vapors have the potential to volatilize from contaminated groundwater and collect inside closed spaces (e.g., basements), and this "vapor intrusion" poses potential health concerns. Vapor intrusion studies have been conducted during the RI at a number of properties. EPA targeted residential properties between the former CDE facility and Spring Lake, where shallow groundwater contamination posed a plausible concern for vapor intrusion occurring (areas with only deeper groundwater contamination are not at risk). EPA also targeted a number of properties in the core OU1 study area, just south of the former CDE facility, as a precaution. These studies indicate that vapor intrusion exposures are not a current pathway of concern at the site. EPA tested 25 properties, and all but two showed no evidence of vapors in the subsurface. Although elevated vapor levels were detected under the basement slab at two properties, one was in an area not affected by site groundwater contamination, and at the other, only PCE was detected. A local source of PCE appears to be affecting this property, as the PCE does not originate from the site. In both cases, there was no evidence of vapors inside the structures.

SCOPE AND ROLE OF ACTION

EPA is addressing the cleanup of the site in four phases, called operable units. Operable Unit 1 (OU1) addresses residential, commercial and municipal properties with elevated PCB levels in surface soils or interior dust in the vicinity of the former CDE facility. OU2 addresses buildings and soil at the former CDE facility, and included relocation of tenants from the facility followed by demolition of the buildings, excavation and on-site treatment or off-site disposal of PCB-contaminated soil and debris, and capping of the 26-acre facility. The OU1 and OU2 remedies are currently being performed by EPA using Federal and State funding. This Proposed Plan is for Operable Unit 3 (OU3), groundwater, which will comprise the final action for the groundwater. Operable Unit 4 will address sediments and surface water in the Bound Brook and will be the final phase of the response action for the site.

OU2 addressed "principal threat wastes" in soils, including wastes that were considered ongoing source materials of groundwater contamination. EPA generally does not consider groundwater as principal threat waste, although NAPLs may be viewed as source materials. At this site, EPA has not designated the groundwater a principal threat waste.

In 2000, the Borough of South Plainfield began assessing potential future redevelopment plans for the Hamilton Industrial Park, and how that redevelopment might be accomplished as part of a remedy for the facility soils and buildings (OU2). In December 2001, the South Plainfield Borough Council designated the Hamilton Industrial Park and certain lands in the vicinity a "Redevelopment Area," and in July 2002, the Borough adopted a redevelopment plan. The Borough subsequently designated a developer for the site. With the OU2 cleanup nearing completion, EPA has been working with the developer to resolve the many engineering and legal issues associated with putting the former CDE facility property back into productive use.

ENFORCEMENT

EPA has identified a group of potentially responsible parties (PRPs) for the site. PRPs for the site include Cornell-Dubilier Electronics, Inc. (CDE), Dana Corporation, Dana Corporation Foundation, and Federal Pacific Electric Company (FPEC). In addition, DSC, the current owner of the site property, has been named as a PRP.

Early in the cleanup process five administrative orders were issued to various PRPs for the performance of portions of removal actions required at the site. These included the site stabilization order issued to DSC in 1997 described above. In 1998, 1999, and 2000, EPA entered into a series of administrative orders with PRPs to implement removal actions at fourteen properties with PCB-contaminated soil.

The PRPs declined to undertake the site RI/FS, and with each of the selected remedies (OU1 in 2003 and OU2 in 2004), the PRPs again declined to perform the remedies. The Dana Corporation declared bankruptcy in 2006, and EPA reached a bankruptcy settlement in 2008.

SUMMARY OF SITE RISKS

As part of the RI/FS, a baseline human health risk assessment was conducted to estimate current and future effects of contaminants on human health and the environment. A baseline human health risk assessment is an analysis of the potential adverse human health effects caused by hazardous-substance exposure in the absence of any actions to control or mitigate these exposures under current and future site uses.

A four-step human health risk assessment process was used for assessing Site-related cancer risks and noncancer health hazards. The four-step process is comprised of: Hazard Identification of Chemicals of Potential Concern, Exposure Assessment, Toxicity Assessment, and Risk Characterization (see adjoining box "What is Risk and How is it Calculated" for more details on the risk assessment process).

Chemicals of potential concern were selected by comparing the maximum detected concentration of each analyte in groundwater with available risk-based screening values for potentially complete pathways. TCE, cDCE and other VOCs, along with PCBs were determined to be chemicals of potential concern in site groundwater.

WHAT ARE THE "CONTAMINANTS OF CONCERN"?

EPA has identified VOCs (primarily TCE and its breakdown products, the most prominent of which is discussed below) and PCBs as contaminants in groundwater at the site that pose the greatest potential risk to human health.

Trichloroethylene (TCE): TCE has been historically used as a solvent and degreaser in many industries. TCE is considered a probable human carcinogen. The highest levels of aqueous-phase TCE (found in bedrock beneath the former CDE facility) exceed 150,000 µg/L. The concentration of aqueous-phase TCE off site exceeds 1,000 µg/L near Veteran's Memorial Park.

cis-1,2-Dichloroethylene (cDCE): cDCE is a known breakdown product of TCE. The highest levels of cDCE were detected at 39,000 µg/L in shallow on-site groundwater. Off-site groundwater was detected just over 100 ug/L in shallow groundwater north of Bound Brook.

Polychlorinated Biphenyls (PCBs): PCBs have been historically used as dielectric fluid in electrical capacitors. PCBs are considered probable human carcinogens. The highest levels of aqueous-phase PCBs (found in bedrock beneath the former CDE facility) exceed 200µg/L.

The exposure assessment identified potential human receptors based on a review of current and reasonably foreseeable future land use at the site. The CDE groundwater study area is primarily residential interspersed with commercial and public-use properties. Based on the NJDEP classification of groundwater within the site as Class IIA groundwater (i.e., includes potable usage), a future residential scenario for groundwater was evaluated as part of the risk assessment. Potentially exposed populations in current and future risk scenarios included: commercial/industrial workers, construction/utility workers and residents. Potential exposure routes evaluated for these receptors included ingestion and dermal contact with constituents in groundwater, as well as inhalation of constituents volatilizing to ambient or indoor air from groundwater. The toxicity assessment identified potential effects generally associated with exposure to the chemicals of potential concern. Two types of toxic effects were evaluated for each receptor in the risk assessment: carcinogenic effects and non-carcinogenic effects. Calculated risk estimates for each receptor were compared to EPA's acceptable range of carcinogenic risk of 1 x 10-6 (one-in-one million) to 1 x 10-4 (one-in-ten thousand) and calculated noncancer health hazard to a target value of 1. Quantitative assessment of receptors under the future potable groundwater use exposure scenarios indicated that contaminated water at the site

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the chemicals of potential concern (COPCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other noncancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and noncancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one in ten thousand excess cancer risk;" or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one in ten thousand to a one in a million excess cancer risk. For noncancer health effects, a "hazard index" (HI) is calculated. The key concept for a noncancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which noncancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a noncancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site.

poses an unacceptable carcinogenic risk to human health due to the presence of TCE in groundwater above maximum contaminant levels (MCLs) for drinking water. Other VOCs and arsenic were also minor contributors to risk in groundwater. Unacceptable carcinogenic risk was calculated for the following exposure groups: Commercial/Industrial risk is 4 x 10^{-3}; Resident adult risk is 7 x 10^{-3}, resident child risk is 3 x 10^{-3}.

Quantitative assessment also indicates that groundwater contamination poses unacceptable noncancer health hazards due to PCBs and cDCE for all future use scenarios as well (construction worker, commercial/industrial worker, resident). PCBs were the main risk-driving contaminant in groundwater in the area around the former CDE facility. PCBs were not found away from the facility; cDCE was the primary noncancer risk-driver in off-site areas. Noncancer Hazard Indices ranged from 3 for the construction/utility worker exposure to shallow off-site groundwater to 700 for resident child exposure to the entire aquifer. Risk and hazard estimates for the remaining receptors were less than or fell within the acceptable risk range of EPA's target values.

It is EPA's current judgment that the Preferred Alternative identified in this Proposed Plan is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Ecological Risk Assessment

A plausible ecological exposure scenario may derive from groundwater discharge to the Bound Brook, and EPA is assessing ecological risks as part of OU4. The likelihood of a completed ecological exposure pathway for VOCs in surface water is remote given their volatility. Also, while EPA is assessing the potential for PCB transport to the creek via groundwater, EPA has already detected elevated PCBs in sediments of this section of the Bound Brook at concentrations several orders of magnitude higher than the most elevated groundwater concentrations, probably resulting from buried materials in or adjacent to the Bound Brook. Thus, EPA's assessment of the potential for PCBs to enter the Bound Brook is only evaluating the potential for recontamination after completion of a potential OU4 remedy. There are no other plausible ecological receptors for groundwater.

REMEDIAL ACTION OBJECTIVES

In developing Remedial Action Objectives (RAOs) for groundwater, EPA expects to return usable groundwater to its beneficial uses (in this case, use as drinking water) wherever practicable, within a timeframe that is reasonable given the characteristics of the site. EPA also acknowledges, however, that groundwater restoration is not always achievable due to limitations in remedial technologies and other site-specific factors.

After evaluating the nature and extent of groundwater contamination and the available remedial alternatives for groundwater, EPA has concluded that the available technologies cannot achieve restoration of the contaminated groundwater to drinking water standards. EPA is recommending a waiver of applicable or relevant and appropriate requirements (ARARs) due to technical impracticability (TI) for groundwater at the site. EPA documented its evaluation of the potential for groundwater restoration in a separate TI Evaluation Report, and identified a zone where ARARs are expected to be exceeded for the foreseeable future (For further details, please refer to Figure 7-1 from the TI Evaluation Report, in the Administrative Record).

When restoration of groundwater to beneficial uses is not practicable, EPA selects an alternative remedial strategy that is technically practicable, protective of human health and the environment, and satisfies statutory and regulatory requirements of CERCLA. Consistent with the National Contingency Plan (NCP), alternative remedial strategies for TI sites typically address three site issues: "exposure control;" "source control;" and "aqueous plume remediation." RAOs have been developed for each component of EPA's recommended alternative remedial strategy.

Remedial Action Objective for "Exposure Control"

The primary objective of any remedial strategy is overall protectiveness, in this case by mitigating exposure to contaminated groundwater for potential receptors:

- Prevent or minimize potential risks to human and ecological receptors from exposure by contact, ingestion, or inhalation/vapor intrusion of contaminants in groundwater attributable to the site.

Remedial Action Objectives for "Source Control"
For "source control," when restoration of groundwater to beneficial uses is not practicable and a TI waiver is necessary, EPA expects to address contaminant source areas to the extent practicable, particularly when addressing groundwater sources also supports further risk reduction for the site as a whole. By implementing a remedial action for the former CDE facility, which addresses VOCs and PCBs in the overburden soil, EPA has already addressed site sources to the extent practicable, and the OU2 remedy also supports further risk reduction at the site overall. Thus, the OU3 FS evaluated whether further "source control" actions could be taken in the bedrock aquifer.

For the bedrock groundwater, the extensive zone over which VOCs have adsorbed to and/or diffused into the bedrock matrix (approximately 825 acres) constitutes what is expected to be an ongoing source of contamination to the groundwater, via back diffusion to the groundwater in the fractures, for centuries.

As discussed in the TI Evaluation Report, there are no remedial prospects for achieving ARARs for the whole of the affected aquifer within a reasonable timeframe. The primary processes whereby the contaminants will naturally attenuate (dilution, dispersion and natural degradation) are occurring in portions of the aquifer, but at very slow rates, and there are no currently available technologies effective at remediating the majority of the mass within in the rock matrix pore water.

While restoration of the entire aquifer is not practicable, the OU3 FS evaluated whether treatment and/or containment of higher concentration areas in groundwater and in the rock matrix pore water might further satisfy EPA's expectation to address source areas. For example, the FS evaluated whether reducing the mass remaining in the ground might allow at least part of the aquifer to restore more quickly. The RAOs used to assess these "source control" alternatives are as follows:

- Mitigate, to the extent practicable, a "contaminant source area" as an ongoing source of groundwater contamination to areas beyond it;
- Demonstrate the potential (through predictive aquifer modeling) that mass reduction or containment of the targeted "contaminant source area" would provide long-term improvement to the groundwater in a reasonable time frame; and
- Support further risk reduction for the site as a whole.

To satisfy these RAOs, the FS evaluated two different "contaminant source areas" of different contaminant concentrations at the area of the original release, the former CDE facility: 1) a zone in which concentrations of total VOCs exceed 25,000 µg/L; and 2) a zone in which concentrations of total VOCs exceed 2,500 µg/L. The 25,000 µg/L contour encompasses most of the area where VOC mass has fully penetrated the rock matrix. The 2,500 µg/L total VOC area was selected as a second point of comparison, to allow for the evaluation of a remedy one order of magnitude larger in scope than the 25,000 µg/L total VOC area. (A more comprehensive discussion of the rationale for selecting these zones is included in the FS.)

Remedial Action Objective for "Aqueous Plume Remediation"
Wide-spread rock matrix diffusion is the primary site factor that renders plume restoration technically impracticable, with the VOCs in the rock matrix pore water acting as a continuing source to neighboring rock fractures for the foreseeable future. In such cases, EPA considers hydraulic containment of the leading edge of the aqueous plume, assuring that the plume size does not increase and, in combination with either active aquifer restoration (pumping wells) or natural processes (diffusion, dispersion and natural degradation), allowing portions of the aquifer outside the TI zone to recover and eventually meet ARARs.

Groundwater modeling conducted as part of the RI demonstrated that, given that the original DNAPL releases occurred at least 50 and as long as 80 years ago, the VOCs have, over that period of time, spread throughout the aquifer to the maximum extent possible, and the leading edge of the plume is not currently expanding. Groundwater flow direction is controlled by municipal well pumping. The rate and extent of pumping has varied over time, but within a relatively narrow range, generating a relatively stable flow field.

While the plume may not currently be expanding, the following RAO has been developed to satisfy EPA's expectations with respect to the prevention of further plume expansion and, to the extent practicable, restoration of the aqueous plume:

- Prevent further migration of site contaminants in groundwater at levels posing an unacceptable risk to human health beyond the areal extent of the proposed TI zone.

The remedial alternatives discussed below do not actively address this RAO because, as previously mentioned, groundwater modeling indicated that the VOCs have spread throughout the aquifer to the maximum extent possible, and the leading edge of the plume is not currently expanding.

Remediation Goals
The bedrock aquifer has been identified by New Jersey as Class IIA (a potential source of drinking water); therefore, applicable or relevant and appropriate requirements (ARARs) for groundwater include the NJDEP Groundwater Quality Criteria (NJAC 7:9-6), the Safe Drinking Water Act maximum contaminant levels (MCLs), and the New Jersey Secondary Drinking Water Standards (NJAC 7:10-7).

To meet the "exposure control" and "aqueous plume remediation" RAOs defined above, EPA has identified remediation goals to aid in defining the extent of contaminated groundwater. In general, remediation goals establish media-specific concentrations of site contaminants that will pose no unacceptable risk to human health and the environment. For each constituent, the lower of the EPA federal MCLs or NJDEP Groundwater Quality Criteria was selected as the remediation goal for groundwater, listed in Table 1. These remediation goals would be used for developing use restrictions and other actions to prevent exposure to, and for assessing the extent of (or expansion of) the aqueous plume, but not for achieving restoration of the groundwater.

These remediation goals are relevant to the "source control" RAOs defined above, though in a different way. It is possible that a treatment action (as opposed to containment) would achieve these remediation goals in at least a portion of the targeted "contaminant source areas." More important, however, the FS explored whether removing contaminant mass from one part of the aquifer might improve overall groundwater quality, possibly achieving the remediation goals for some down-gradient part of the contaminated aquifer in a reasonable timeframe.

Surface Water
Based upon water level measurements, groundwater may be discharging to Bound Brook near the site. The potential for groundwater constituents to migrate to surface water and sediments in the Bound Brook is being evaluated as part of the OU4 RI/FS. Groundwater RAOs related to a possible surface water discharge pathway cannot be fully evaluated until the OU4 RI field work and subsequent risk assessments are completed. Should a response action related to groundwater discharge to Bound Brook be needed, it will be considered in the OU4 FS.

SUMMARY OF REMEDIAL ALTERNATIVES

Common Elements
All the alternatives except "no action" include common components to address "exposure control." Because any combination of remedial alternatives will result in some contaminants remaining on the site above levels that would allow for unrestricted use, five-year reviews would be conducted. In addition, institutional controls such as a Classification Exception Area (CEA) would be required for the affected groundwater as one component of maintaining the long-term protectiveness of the implemented remedy.

Exposure Control
Municipal water is available to residents and businesses throughout the study area, so exposure to contaminated groundwater through direct contact or ingestion or inhalation would only occur as a result of direct exposure from an older, private well. (EPA's efforts to locate private wells are discussed elsewhere in this Proposed Plan.) Vapor intrusion is not currently a site pathway for contaminant migration or inhalation exposure. The primary RAO with respect to groundwater is to prevent unacceptable risks to receptors by preventing exposure to groundwater contaminants. This includes encouraging the use of existing municipal drinking water supplies that are already treated and frequently tested, and surveying older private wells that may still remain in the area, including wells that might be used privately for non-potable uses (e.g., lawn watering) to ensure that they do not provide a conduit to exposure.

All the alternatives, with the exception of the "no action" alternative, include groundwater monitoring. Monitoring would be performed primarily using wells that are already in place. The most-distant monitoring well installed, MW-23, still has elevated VOC levels; therefore, monitoring points further down gradient would be needed. However, note that MW-23 is well within the zone of influence of the Park Avenue Wellfield, and that there are other sources of the same VOCs within the aquifer. For wells further down gradient than MW-23, it will become difficult to distinguish VOCs that might be coming from the CDE plume or from some other nearby source.

All the alternatives, with the exception of the "no action" alternative, include periodic vapor intrusion testing. While EPA has already performed extensive vapor intrusion testing in areas potentially threatened (within the footprint of the shallow plume), under any active remedy, EPA would require additional testing, either soil gas probes or actual testing of residences, to assure that conditions have not changed and that there is not an exposure pathway through vapor intrusion.

Aqueous Plume Remediation

As discussed earlier, the RI concludes that the aqueous plume is not currently expanding, due to the age of the contaminant plume and the ongoing hydraulic draw of municipal pumping wells. As part of any active remedy, monitoring would be required to confirm that this conclusion is valid, and to identify changes that might occur in the future that might cause the plume to expand beyond its current limits. In addition to the groundwater monitoring discussed earlier, the remedy would monitor the rates of pumping of municipal wells in the area and assess the effects of changes in pumping. For example, closing a municipal wellfield or, alternatively, the startup of some new municipal pumping center outside the contaminant plume, has the potential to change the extent of the contaminant plume. In addition, the remedy would also monitor the influent concentrations at nearby municipal wells for changes in VOC levels, as additional evidence that the plume is, in fact, not expanding.

Should monitoring indicate that the plume is actually expanding, EPA would have limited options at its disposal, in the form of some kind of hydraulic containment. Given the current size of the CDE groundwater plume, the hydraulic containment required may need to be on a massive scale, pumping the aquifer in a way that would be akin to, and would compete with, local municipal pumping wells. For example, the site hydraulic containment alternatives discussed below would be designed for less than 50 gallons per minute (50 gpm) of pumping, or 72,000 gallons per day; in contrast, attaining hydraulic control of the plume could require pumping on the order of 1 to 2 million gallons per day.

Should such a response action be needed, EPA would consider restarting the currently inactive Spring Lake Wellfield, in collaboration with MWC, rather than building a new hydraulic containment system essentially at this same location. Groundwater modeling performed as part of the RI indicated that, when it was active, the Spring Lake wells did control the flow of groundwater from the site, and the zone of influence appears to have been large enough to assert hydraulic control to the current extent of the groundwater plume. This would need to be verified, and additional pumping might be needed. The Spring Lake Wellfield has its own treatment system (an air stripping tower) that may need modification before it could be restarted.

This scenario is described here to better define the purpose of the monitoring contemplated in this Proposed Plan. At this stage, EPA does not believe hydraulic containment of the plume is necessary. EPA would present additional findings to the public before undertaking such an action.

Further Source Control

The active components of Alternatives 3 and 4 focus on achieving the “source control” RAOs discussed above. Potential applicable technologies were identified and screened using effectiveness, implementability and cost as criteria, with emphasis on the effectiveness of the remedial action. Those technologies that passed the initial screening were then assembled into four remedial alternatives. In-situ VOC destruction technologies typically associated with the treatment of VOC plumes, such as in-situ chemical oxidation or enhanced biodegradation, did not survive this screening process, because they had no capacity to treat the VOCs trapped within the pore spaces of the rock matrix, the zone of the bedrock that is currently retaining the bulk of the contaminant mass. The FS concluded that aquifer heating, as discussed in Alternative 4, had the best chance of drawing VOCs out of the rock matrix within a reasonable timeframe.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, procure contracts for design and construction, or for subsequent operation and maintenance.

Alternative 1 - No Action

Capital Cost:	$0
Annual O&M Costs:	$0
Total Present Worth:	$0
Implementation Timeframe:	Not Applicable

Superfund regulations require that the "No Action" alternative be evaluated at every site to establish a baseline for comparison with other remedial alternatives. Under Alternative 1, no further remedial actions would be taken to address the groundwater. Alternative 1 does not include monitoring or institutional controls. Because no action results in contaminants remaining on site above acceptable levels with no controls, a review of the site at least every five years would be required.

Alternative 2 – Groundwater Monitoring, Institutional Controls

Capital Cost:	$1,529,000
Annual O&M Costs:	$190,700
Total Present Worth:	$5,721,000
Implementation Timeframe:	*1 Year*

Under this alternative, a long-term groundwater monitoring program would be instituted to collect data on contaminant concentrations and plume properties at the site. Groundwater samples would be collected, at least annually to start, and analyzed for VOCs, PCBs in representative wells, general water quality parameters, and natural attenuation parameters. Monitoring would also include coordinating with MWC and assessing changes in pumping or influent water quality to municipal systems. Institutional controls would include restricting the installation of new wells, identification and closure of any private potable wells in the plume area, with the intent to reduce potential future exposure to contaminants. Institutional controls would include a CEA, pursuant to NJDEP regulations. A review of site conditions would be conducted every five years that would include an evaluation of the extent of contamination and an assessment of contaminant migration and attenuation over time.

Monitoring under this remedial alternative would include periodic vapor intrusion testing, coupled with ongoing groundwater monitoring of the plume.

Alternative 3 – Hydraulic Containment of the "Contaminant Source Zone"

Alternative 3a Target:	*25,000 mg/l plume*
Capital Cost:	*$3,839,000*
Annual O&M Costs:	*$635,000*
Total Present Worth:	*$17,440,000*
Implementation Timeframe:	*1 Year*

Alternative 3b Target:	*2,500 mg/l plume*
Capital Cost:	*$5,271,000*
Annual O&M Costs:	*$808,000*
Total Present Worth:	*$21,019,000*
Implementation Timeframe:	*1 Year*

Alternative 3 involves controlling the discharge of contaminated groundwater from the "contaminant source zone" (either the 25,000 µg/L or 2,500 µg/L VOC area) to meet the "source control" RAOs. Alternative 3 also includes the monitoring and institutional controls discussed in Alternative 2.

For Alternative 3a, hydraulic control of groundwater could be accomplished by extracting contaminated groundwater at a rate of approximately 7 gpm using one vertical extraction well, approximately 50 feet deep, located in the center of the treatment area (near the current well MW-14). For Alternative 3b, hydraulic control of groundwater could be accomplished by extracting contaminated groundwater at a rate of approximately 24 gpm via three vertical extraction wells, each approximately 50 feet deep, and located approximately as shown on Figure 8. An on-site water treatment system would treat the extracted groundwater. The groundwater treatment system is assumed to include oil-water separation (to remove NAPL), chemical or ultraviolet oxidation to treat organics (VOCs, PCBs, etc.), metals removal, followed granular activated carbon (GAC) treatment as a polishing step prior to discharge to Bound Brook.

Hydraulic control through groundwater extraction removes very little contaminant mass – only that which is present in the bedrock fractures in the area of hydraulic influence. The cost evaluation of Alternative 3a or 3b assumes a duration of 30 years, a default value used for most Superfund remedies for cost comparison between different alternatives. However, the time frame for back diffusion of contaminant mass (primarily TCE and cDCE) residing in the rock matrix back to the fractures is on the order of decades and centuries. Therefore, it is expected that hydraulic control/capture (along with the attendant treatment works) for both Alternatives 3a and 3b would be required indefinitely, assuming that it would continue while concentrations of contaminants exceed the remediation goals.

This "source control" alternative was evaluated to assess whether, by eliminating the "contaminant source area" through hydraulic control at the site, areas down-gradient of the site would show sufficient improvement over time to satisfy the RAO to "provide long-term improvement to the groundwater in a reasonable time frame." This evaluation was primarily based upon groundwater modeling, which can be used to predict groundwater conditions projected out into the future, using site-specific data about current conditions. The groundwater model predicted groundwater conditions 50 years from now and 100 years from now, under current conditions and with the hydraulic controls of Alternative 3a or 3b. The modeling indicated that removing either the smaller or larger "contaminant source area" at the site would not change down-gradient groundwater conditions to any significant degree – no down-gradient areas would reach the remediation goals, or improve even marginally, with the hydraulic controls in place. The on-site source appears to have very little influence on down-gradient groundwater conditions over the long term, and “controlling the source” neither improves nor diminishes overall aquifer conditions to any significant degree.

Alternative 4 – Thermal Treatment of the “Contaminant Source Zone”

Alternative 4a Target:	*25,000 mg/l plume*
Capital Cost	*$27,340,000*
Annual O&M Costs:	*$190,700*
Total Present Worth:	*$33,061,000*
Implementation Timeframe:	*1 Year*

Alternative 4b Target:	*2,500 mg/l plume*
Capital Cost:	*$122,800,000*
Annual O&M Costs:	*$190,700*
Total Present Worth:	*$128,521,000*
Implementation Timeframe:	*3 Years*

Alternative 4 involves thermal treatment of the “contaminant source zone” (either the 25,000 µg/L or 2,500 µg/L VOC area) to meet the “source control” RAOs. Alternative 4 also includes the monitoring and institutional controls discussed in Alternative 2. The FS developed a conceptual design with a target temperature for the aquifer of 100°C (212°F). At this temperature, VOCs in the treated area would be vaporized and mobilized to a series of vapor and fluid collection points.

The conceptual thermal treatment design includes the following major components:

- Installation of heater wells, vertical soil vapor extraction (SVE) points and multiphase extraction (MPE) wells to treat to a depth of 50 feet. The heater wells would be installed at a 15-foot spacing, and the heater wells would generate very high temperatures (in excess of 500°C/932°F), heating the spaces between the wells to the target temperature.
- Installation of steam injection wells and MPE wells between 50 and approximately 65 feet bgs. The steam wells would be installed at a 30-foot spacing.
- If needed, a vapor cap would be installed to extend slightly beyond the boundaries of the treatment area, to capture fugitive vapors.
- Thermal oxidation is assumed for use as an above-ground vapor and fluid treatment technology, and liquid GAC is included for the liquid treatment.

By constantly drawing off the vapors, the entire treatment zone is kept under a vacuum to minimize transport of contaminants out of the treatment area. The use of steam at the bottom of the thermal treatment area creates a “hot floor” to provide a barrier to vertical migration of contaminants. At 100°C, dissolved phase and DNAPL VOCs would be vaporized and removed as a vapor or a mobilized liquid via the collection network (SVE and MPE wells).

Although a portion of the PCBs would likely also be removed, higher temperatures would be needed to obtain reliable removal of PCBs. Temperatures higher than 100°C are only attainable if the aquifer is dewatered, which is not feasible given the highly transmissive weathered rock zone at 65 feet bgs. The fate of dissolved and adsorbed contaminant mass located within the rock matrix is uncertain; however, it is assumed that at least a portion of the contaminant mass within the rock matrix would be volatilized out of the rock matrix and be captured by the SVE and MPE wells.

For Alternative 4a (approximately 2 acres), implementation of the remedy is estimated to take approximately 12 months, including time required to drill the various wells and heating points, the time required to bring the aquifer up to the target temperature, and time to demobilize. The active treatment of the aquifer would require approximately five months of that time period.

For Alternative 4b, which is approximately five times larger than Alternative 4a, it is assumed that the treatment area would be divided into five zones, each one encompassing approximately the same size as Alternative 4a, and that they would be treated in sequence. Thermal treatment would be performed starting in areas of highest contaminant concentrations and moving out to zones with lower concentrations. The duration of thermal treatment for Alternative 4b would be approximately 36 months. It is anticipated that up to 3,000 heater wells and hundreds of SVE wells, MPE wells, and steam injection wells would be required to implement thermal treatment over the large area that comprises the 2,500 µg/L VOC plume for Alternative 4b.

Unlike Alternative 3 (hydraulic control), thermal treatment has the potential to remove much of the VOC contaminant mass in the treated area in a relatively short period of time, though the types of heating technologies currently available have not been attempted in an area even as large as Alternative 4a. Additional rock core testing would be required after implementation to gauge the effectiveness of thermal treatment in removing mass from the rock matrix.

As with Alternative 3 (hydraulic containment), Alternative 4 was evaluated to assess if, by treating the “contaminant source area,” the action would “provide long-term improvement to the groundwater in a

reasonable time frame.” For the purpose of this evaluation, the action was presumed to be 100 percent successful, with an equivalent result to hydraulic containment: Nevertheless, the modeling indicates that removing either the smaller or larger “contaminant source area” at the site would not change down-gradient groundwater conditions to any significant degree.

EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES
Overall Protectiveness of Human Health and the Environment evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
Compliance with ARARs evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that are legally applicable, or relevant and appropriate to the site, or whether a waiver is justified.
Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.
Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.
Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
State/Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.
Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

There are several noteworthy limitations to this alternative. The target treatment depth for both Alternatives 4a and 4b is to 65 feet bgs, constrained by the highly transmissive fracture zone that starts at about that depth. This fracture zone is a major contaminant mass transport network and the amount of contaminant mass entrained in the rock and fractures below this zone drops off significantly. Be that as it may, higher VOC concentrations found below this fracture zone cannot be successfully treated by thermal treatment. In addition, the 2,500 µg/L VOC plume extends beyond the northeast CDE facility boundary, and it would not be technically feasible to install the infrastructure needed for thermal treatment at the Bound Brook or in the railroad right-of-way.

EVALUATION OF ALTERNATIVES

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine evaluation criteria are discussed below. A detailed analysis of alternatives can be found in the FS.

1. **Overall Protection of Human Health and the Environment**

Alternative 1, the no action alternative, is not protective of human health and the environment because it does not eliminate, reduce, or control risks posed by the site through treatment, engineering controls, or institutional controls. Alternative 2, long-term groundwater monitoring and institutional controls, would be protective of human health and the environment through the elimination of exposure pathways and the implementation of institutional controls. Alternatives 3a/3b and 4a/4b also include institutional controls to mitigate potential risks resulting from exposure to groundwater; thus, Alternatives 2 through 4 would be protective of human health and the environment.

“Overall protection of human health and the environment” also assesses the degree to which the remedial alternatives achieve the applicable Remedial Action Objectives (RAOs). None of the alternatives, including Alternative 3 or Alternative 4 appear likely to satisfy the “source control” RAOs. While some reduction in mass or migration potential is achieved by Alternatives 3 and 4, EPA’s modeling indicates that treating the targeted source zones would not improve conditions in down-gradient segments of the aquifer. Given that, in the case of Alternative 4b, this source

zone is the largest that might be addressed by a site remedy, further source remediation (beyond that already achieved by the OU2 remedy) offers little potential to improve site conditions.
Because Alternative 1 (No Action) is not protective of human health and the environment, it was eliminated from consideration under the remaining evaluation criteria.

2. **Compliance with ARARs**

State and Federal drinking water standards are considered ARARs for groundwater at this site. Experience at similar sites with matrix diffusion of VOCs or PCB contaminants in bedrock indicates that addressing the site with currently available technologies cannot achieve the ARARs for groundwater within a reasonable time period. Because groundwater restoration is technically impracticable, EPA is recommending an ARAR waiver for the groundwater.

The "3" and "4" Alternatives are limited in scope, attempting to address the area of the bedrock where the highest contaminant mass is found. They are not meant to achieve ARARs even in these limited treatment zones. Alternative 3a or 3b would not significantly change contaminant concentrations in the bedrock, because groundwater extraction only affects water in the fractures and draws almost no contaminant mass from the rock matrix. Hydraulic containment is expected to reduce the off-site migration of VOCs, but only from the treated zone. Hydraulic containment would have very little influence on the extensive contaminant mass beyond the fractures directly affected by pumping. In addition, the limited effectiveness of hydraulic containment would end as soon as the system was turned off, requiring that the extraction/treatment remedy operate indefinitely.

Under Alternative 4, contaminant concentrations in the treated area of the bedrock would be expected to decrease over a relatively short period of time as a result of the treatment. The high intensity application of heat would be expected to remove much of the sorbed and dissolved phase VOCs, but only within the treated zone and not within the aquifer as a whole. The target aquifer temperature would not remove PCBs within the aquifer, and the dewatering needed to achieve higher temperatures is not technically feasible. Thermal treatment also has several technical limitations with regard to the depth and surficial area that can be treated, so even the relatively limited treatment areas evaluated in this Proposed Plan would be beyond the scope of this technology. Given these factors, and the potential for partial recontamination after the completion of Alternative 4a or 4b (through back diffusion from neighboring untreated zones), it is highly unlikely that ARARs would be achieved under Alternative 4 for the whole treatment zone.

No location-specific ARARs were applicable to the four groundwater alternatives. No other major ARAR considerations affect remedial decision-making. Alternatives 2 through 4 would be completed in compliance with, action- and location-specific ARARs, such as requirements of the Clean Air Act that would apply to air emissions associated with the treatment of groundwater, and requirements of the Resource Conservation and Recovery Act that would apply to management and disposal of treatment residuals.

3. **Long-term Effectiveness and Permanence**

Groundwater modeling indicates that treatment of either of the "contaminant source areas" – areas with the highest contaminant concentrations in bedrock groundwater - would have will have little, if any, impact on the persistence of the down-gradient plume. While some minor reduction in contaminant mass within the plume would be achieved through treatment (particularly through Alternative 4a or 4b), concentrations would still remain elevated for very long time periods (i.e., on the order of several hundred years). Thus, although Alternatives 3a, 3b, 4a, and 4b may locally improve groundwater quality, the long-term effectiveness of all the alternatives over the entire OU3 area, including Alternative 2 (monitoring, institutional controls), would be the same.

The long-term effectiveness of natural attenuation processes was also evaluated through groundwater modeling. The model indicates that VOCs will persist at concentrations exceeding ARARs for very long time periods, because the rates at which these natural processes (diffusion, dispersion and biological degradation) work is very slow. The slow rate of natural attenuation is substantially the result of matrix diffusion, but the lack of plume migration is also due to the effects of matrix diffusion.

4. **Reduction of Toxicity, Mobility, or Volume of Contaminants Through Treatment**

Alternative 2 would not satisfy CERCLA's preference for remedies that include on-site treatment as a principal element, though for this site, the OU2 remedy had treatment of source material in the soils as a principal element. Alternatives 4a and 4b (Thermal

Treatment) would partially meet the preference in CERCLA for treatment on site and would result in a reduction in the volume of VOCs in the treatment areas, and a partial reduction in mobility of VOCs to down-gradient portions of the plume. Alternatives 3a and 3b (Hydraulic Control) would result in a reduction of mobility of contaminants to down-gradient portions of the plume as long as the system was in operation. Overall, however, performing additional "source control" actions in the groundwater shows little or no potential for measureable improvement to the aquifer as a whole, relative to the soil source control action already completed under the OU2 remedy.

5. **Short-term Effectiveness**

Alternatives 3a and 3b (Hydraulic Control) and 4a and 4b (Thermal Treatment) would involve construction and/or in-situ treatment hazards that could pose a greater risk to site workers or the surrounding environment than Alternative 2. However, it is anticipated that these risks could be mitigated through the use of engineering controls, safe work practices, and personal protective equipment. All of the alternatives except Alternative 1 (No Action) involve the drilling and sampling of monitoring wells, which is expected to pose minimal risks to site workers and the surrounding environment.

Construction of Alternative 4 would result in the most significant short-term effects in the community, with the installation of wells, piping, treatment works and possibly capping throughout the treatment areas. This alternative would require sufficient surface infrastructure that it could only be implemented in relatively open areas like the 26-acre site. Alternative 4 would have a major short-term impact on the Borough's redevelopment plans for the former CDE facility, as these plans would probably need to be delayed until the completion of the remedial action.

6. **Implementability**

Alternative 2 (Monitoring with ICs) could be readily implemented using commonly available technologies and with minimal design or permitting. Alternatives 3a and 3b (Hydraulic Control) could also be readily implemented. Alternatives 4a and 4b would likely be the most difficult to implement due to the energy, permitting, and heating controls/infrastructure required. Alternative 4b would be especially difficult to implement because it is uncommon to perform thermal treatment over such a large area; it would require installation of up to 3,000 heater wells and hundreds of SVE wells, MPE wells, and steam injection wells. The installation of this many borings and then subsequent abandonment of all of the wells poses implementation complexities. It is also uncertain to what extent thermal heating would effectively remove contaminant mass from the rock matrix.

As discussed in the description of Alternative 4, the 2,500 µg/L treatment area has been slightly modified because the remedial alternative is not physically implementable over the entire area (e.g., it is not technically implementable to perform thermal treatment in a residential area or in an area adjacent to a stream, and it is depth-limited by the highly transmissive fracture zone).

7. **Cost**

The estimated present worth cost of Alternative 2 is $5,721,000. This cost includes costs associated with the installation of several additional monitoring wells, the sampling and analysis for contamination in the groundwater, and operation and maintenance (O&M) costs over a 30-year period. Although Alternative 2 anticipates installation of only four additional wells followed by regular monitoring of the new wells and existing wells, the monitoring program to support the alternative is extensive. The estimated present worth cost of Alternative 3a is $17,440,000. This cost includes the costs mentioned in Alternative 2 with the addition of the installation and O&M of the hydraulic containment system. Alternative 3b has a similar scope over an increased treatment area from 3a to 3b, though the larger treatment area results in a relatively small difference in present worth cost, $21,019,000. This is because of economies of scale associated with building the larger treatment plant.

The estimated present worth cost of Alternative 4a is $33,061,000. This cost also includes the costs associated with Alternative 2 plus the construction of the heating infrastructure, treatment works, associated piping, and heating and collection wells, along with O&M costs for the monitoring program over a 30-year period.

The estimated present worth cost of Alternative 4b is $128,521,000, reflecting a similar scope to Alternative 4a, over an area roughly five times larger. It is expected that a similar scale of equipment would be constructed as anticipated for Alternative 4a, and that the treatment would take place in phases across the site.

For costing purposes, each alternative has an estimated duration of 30 years although, as discussed above, it is anticipated that contaminant concentrations will exceed

ARARs for much longer time periods. The FS performed a cost sensitivity analysis particularly focusing on this issue of the "real" cost of a remedy over the long term, as well as the discount factor used for present value calculations. Not surprisingly, the primary change was to Alternative 3a/3b, which would require long-term O&M, and eventual replacement of worn out equipment, for a hydraulic containment system that would need to continue operating indefinitely.

8. **State/Support Agency Acceptance**

The State of New Jersey is still evaluating EPA's preferred remedy as presented in this Proposed Plan.

9. **Community Acceptance**

Community acceptance of the preferred alternatives will be evaluated after the public comment period ends and will be described in the Record of Decision, the document that formalizes the selection of the remedy for the site.

PREFERRED ALTERNATIVE

The preferred alternative for groundwater is Alternative 2, Long-Term Groundwater Monitoring and Institutional Controls, hereafter referred to as the Preferred Alternative. The preference for Alternative 2 is based upon three factors: (1) the limited options available to successfully treat VOC and PCB contamination in fractured bedrock with extensive evidence of matrix diffusion into the rock over a wide area; (2) the expected limited ability of the groundwater contamination to move beyond its current extent; and, (3) the limited potential for treatment or containment of even the "contaminant source area" to result in a measureable improvement in groundwater quality anywhere in the aquifer within a reasonable time period.

In addition, EPA is proposing an ARAR waiver for the federal and state drinking water and groundwater standards (MCLs and NJ GQC) at this site due to technical impracticability.

EPA expects this to be the final groundwater remedy for the site; however, two considerations may warrant a reconsideration of a remedy for groundwater in the future:

(1) Groundwater currently discharges to Bound Brook, and the OU4 RI/FS is assessing the extent to which potential contaminant releases via groundwater pose unacceptable risks to human health or the environment. Depending upon the results of these investigations, additional groundwater actions may be contemplated as part of an OU4 remedy.

(2) Data from the RI/FS suggests that the contaminant plume is not expected to expand beyond its current limits. Should monitoring indicate that the plume is actually expanding, EPA would have limited options at its disposal, in the form of some kind of hydraulic containment. Should such a response action be needed, EPA, in collaboration with MWC, would evaluate restarting the currently inactive Spring Lake Wellfield, rather than building a new hydraulic containment system. EPA is not proposing use of the Spring Lake Wellfield as a contingency to the Preferred Alternative. EPA would return to the community with additional findings before undertaking such an action.

The Preferred Alternative is believed to provide the best balance of trade-offs among the alternatives with respect to the evaluation criteria. Based on the information available at this time, EPA believes the Preferred Alternative will be protective of human health and the environment, and will comply with ARARs to the extent practicable. The Preferred Alternative would not meet the statutory preference for the use of remedies that involve treatment as a principal element.

COMMUNITY PARTICIPATION

EPA encourages the public to gain a more comprehensive understanding of the site and the Superfund activities that have been conducted there.

The dates for the public comment period, the date, location and time of the public meeting, and the locations of the Administrative Record files, are provided on the front page of this Proposed Plan. Written comments on the Proposed Plan should be addressed to the Remedial Project Manager Diego Garcia at the address below.

EPA Region 2 has designated a public liaison as a point-of-contact for the community concerns and questions about the federal Superfund program in New York, New Jersey, Puerto Rico, and the U.S. Virgin Islands. To support this effort, the Agency has established a 24-hour, toll-free number that the public can call to request information, express their concerns, or register complaints about Superfund.

For further information on the Cornell –Dubilier Electronics Superfund site, please contact:

Diego Garcia
Remedial Project Manager
(212) 637-4947
garcia.diego@epa.gov

Patricia Seppi
Community Relations Coordinator
(212) 637-3639
seppi.patricia@epa.gov

Written comments on this Proposed Plan should be addressed to Mr. Garcia.

U.S. EPA Region 2
290 Broadway 19th Floor
New York, New York 10007-1866

The public liaison for EPA Region 2 is:
George H. Zachos Regional Public Liaison
Toll-free (888) 283-7626, or (732) 321-6621

U.S. EPA Region 2
2890 Woodbridge Avenue, MS-211
Edison, New Jersey 08837-3679

Legend

Property Boundary

Bound Brook

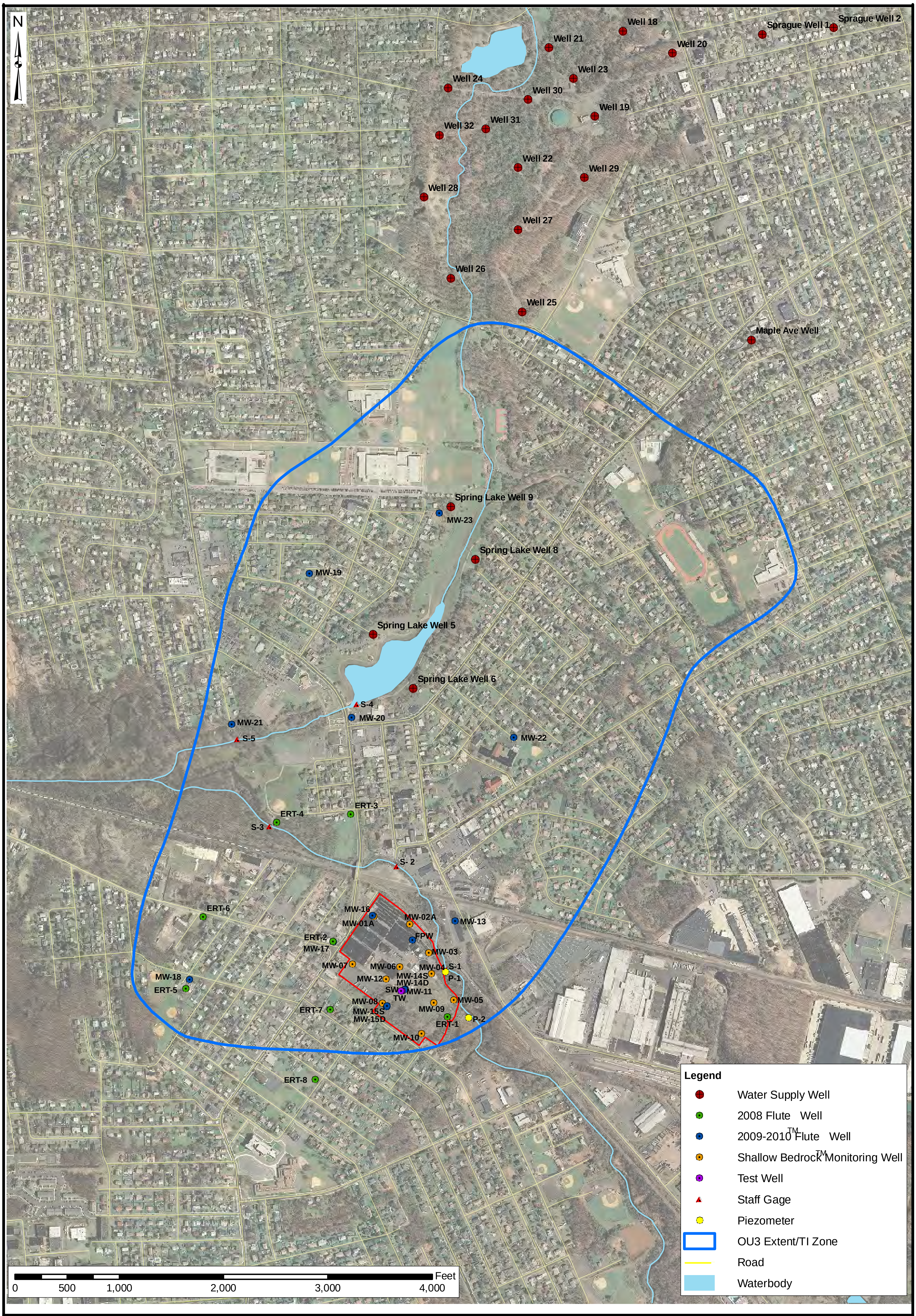
0 250 500 1,000

Feet

Source: New Jersey Geographic Information Network
(NJ 2007 Orthoimagery)

ARCADIS MALCOLM PIRNIE	Cornell-Dubilier Electronics Superfund Site South Plainfield, New Jersey	FORMER CDE FACILITY OPERABLE UNIT 2	FIGURE 1

R2-0023100



ARCADIS MALCOLM PIRNIE

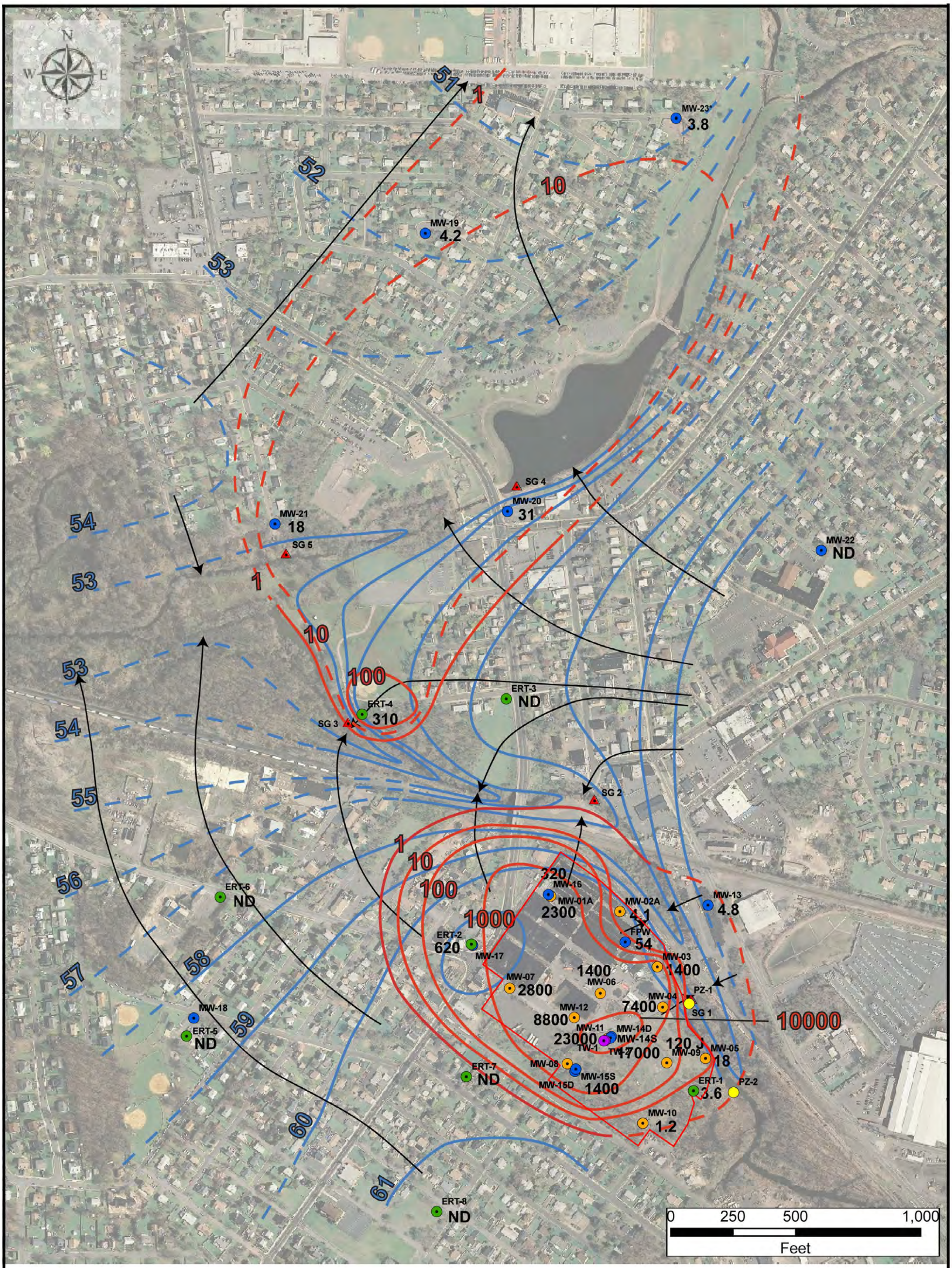
Cornell-Dubilier Electronics Superfund Site

South Plainfield, New Jersey

APPROXIMATE AERIAL EXTENT OF OU3 INVESTIGATION

Figure 2

R2-0023101



Legend

Former CDE Facility

Shallow Bedrock Monitoring Well

2008 Flute™ Well

2009 Flute™ Well

Test Well

Staff Gage

Piezometer

Direction of Groundwater Movement

MCL

Line of Equal TCE Concentration (ug/L) (dashed where inferred)

3.6 Aqueous TCE Concentration (ug/L)

61 Line of Equal Groundwater Elevation (ft msl) (dashed where inferred)

*Note: MW-23 installed and sampled in December 2010, March 2011

ARCADIS MALCOLM PIRNIE
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Cornell-Dubilier Electronics Superfund Site - OU3

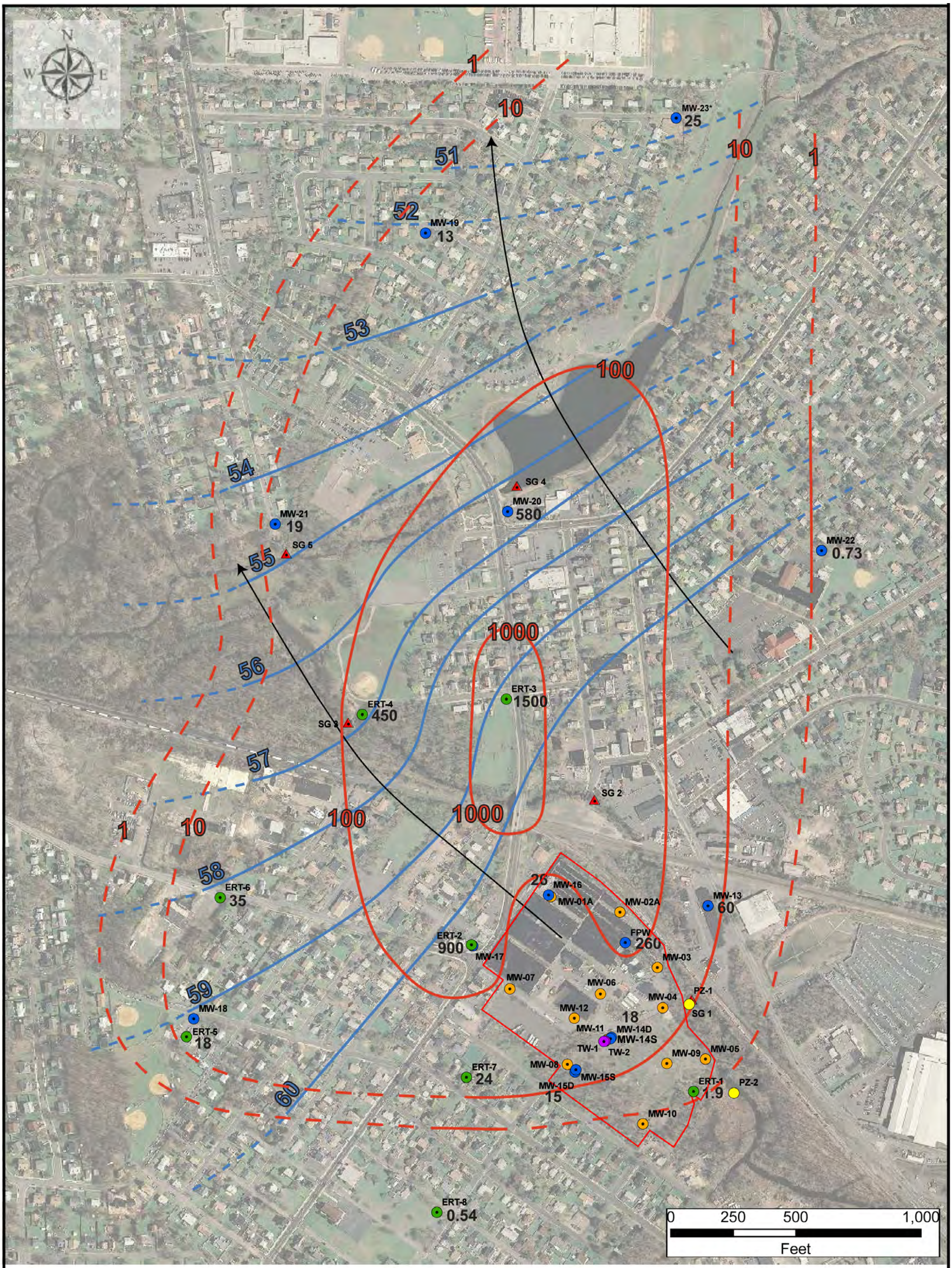
South Plainfield, New Jersey

Potentiometric Surface of Shallow (0' - 120' bgs) Water Bearing Zone July 9, 2010

Aqueous Concentration of TCE March 2010

Figure 3

R2-0023102



Legend

Former CDE Facility	2008 Flute™ Well	Test Well	Piezometer
Shallow Bedrock Monitoring Well	2009 Flute™ Well	Staff Gage	Direction of Groundwater Movement

MCL — 1 — Line of Equal TCE Concentration (ug/L) (dashed where inferred)

3.6 Aqueous TCE Concentration (ug/L)

61 Line of Equal Groundwater Elevation (ft msl) (dashed where inferred)

*Note: MW-23 installed and sampled in December 2010, March 2011

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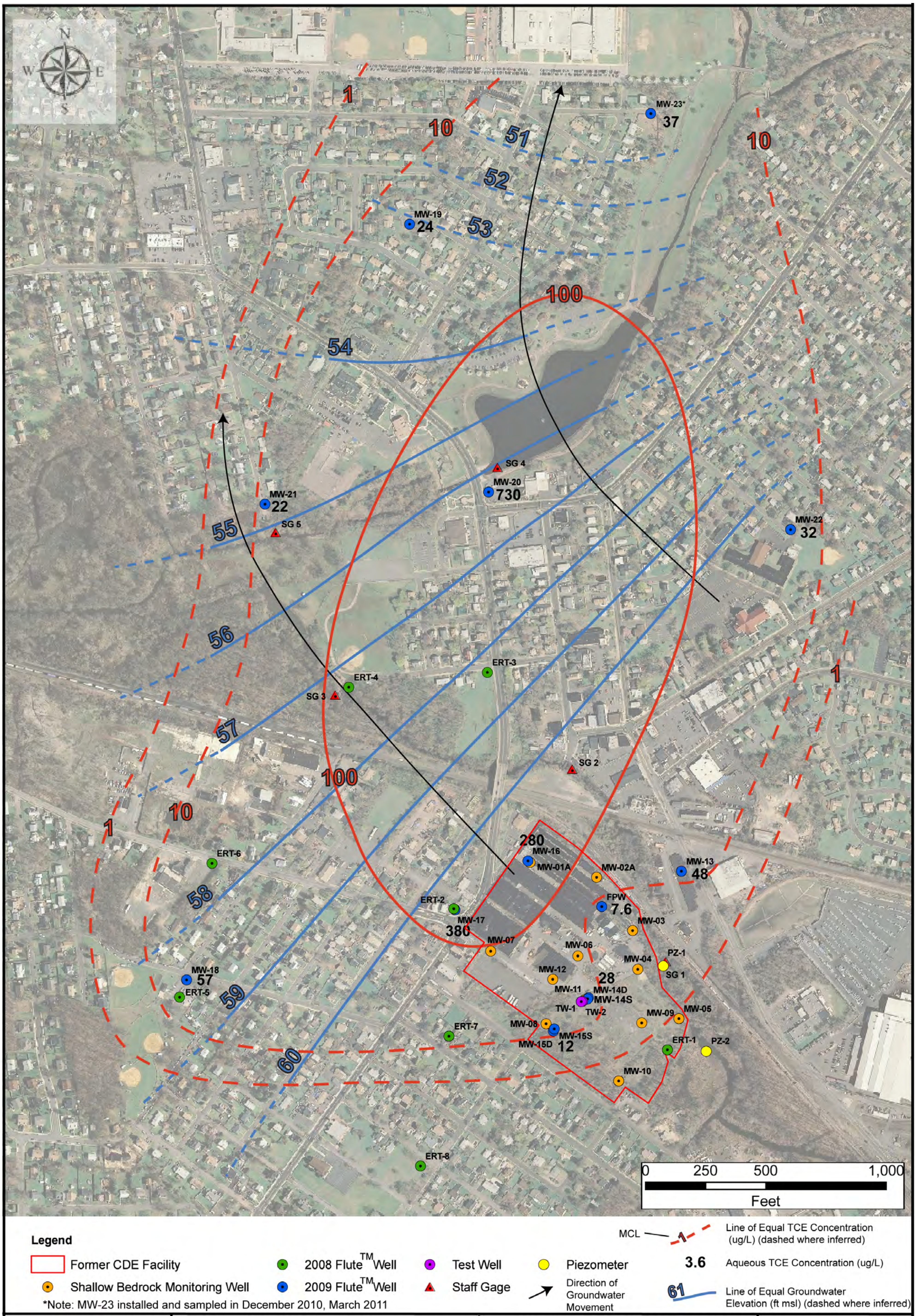
Cornell-Dubilier Electronics Superfund Site - OU3
South Plainfield, New Jersey

Potentiometric Surface of Intermediate (120'-160' bgs) Water Bearing Zone
July 9, 2010
Aqueous Concentration of TCE
March 2010

FIGURE 4



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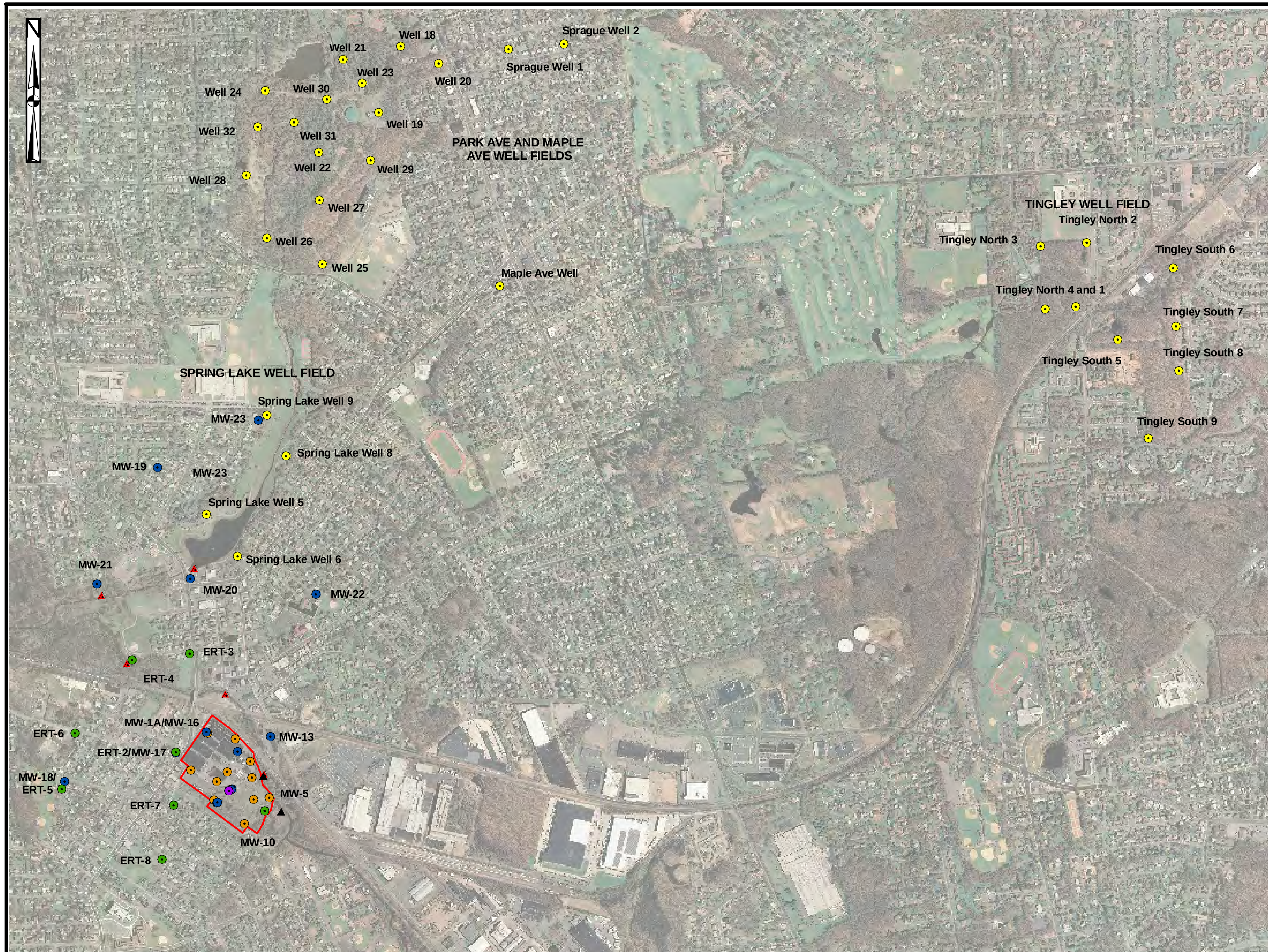
Cornell-Dubilier Electronics Superfund Site - OU3
South Plainfield, New Jersey

Potentiometric Surface of Deep (200' - 240' bgs) Water Bearing Zone
July 9, 2010
Aqueous Concentration of TCE
March 2010

FIGURE 5

R2-0023104



Legend

Former CDE Facility

2008 Flute™ Well

2009-2010 Flute™ Well

Shallow Bedrock Monitoring Well

Test Well

Staff Gage

Piezometer

Pumping Wells (Active and Inactive)

0 1,250 2,500 5,000
Feet

Map Document: G:\project\4553058\GIS\Mxds\All_Well_Locations_Wellfields1.mxd) 5/31/2012 -- 9:57:06 AM

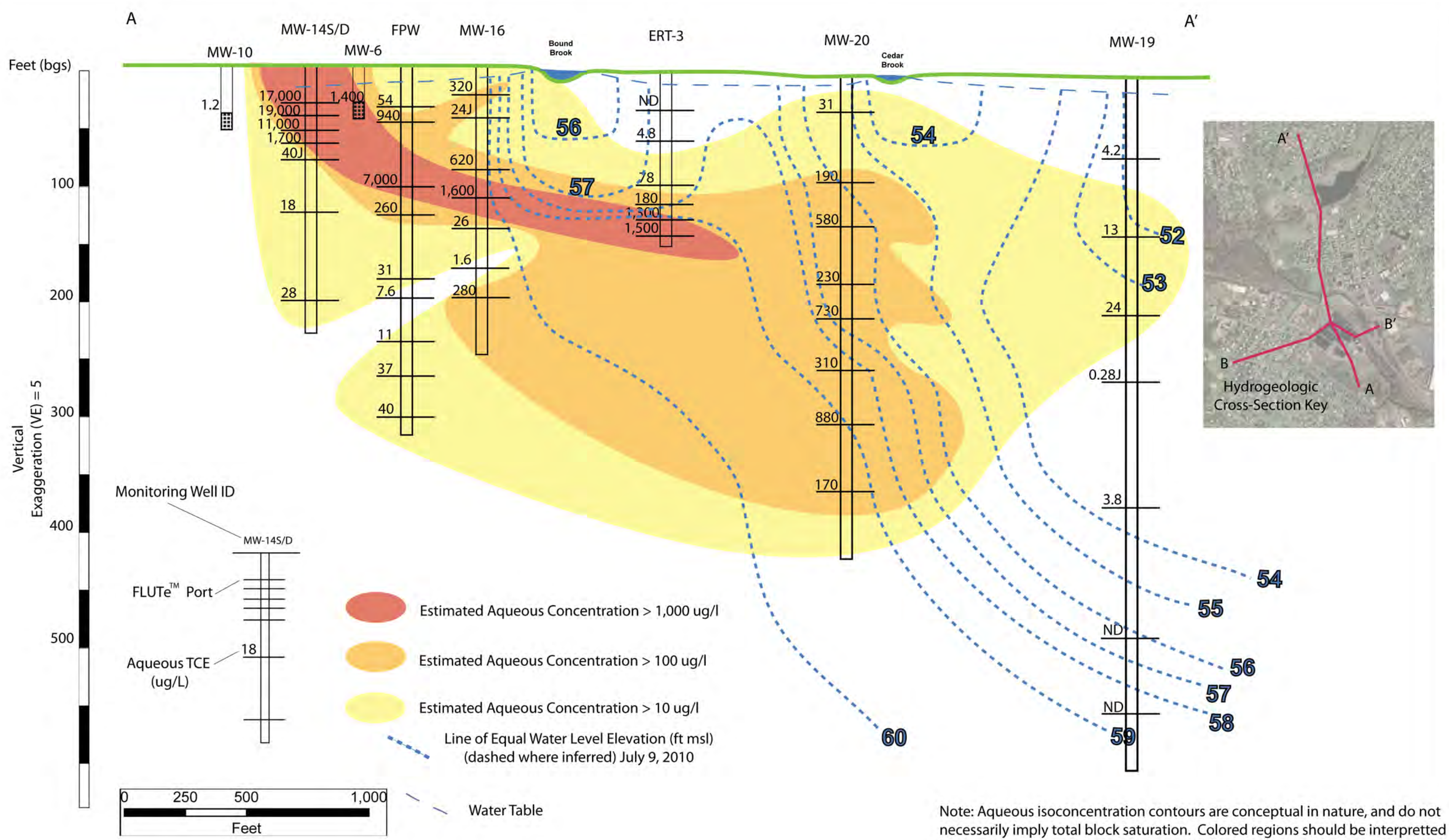
ARCADIS MALCOLM PIRNIE

Cornell-Dubilier Electronics Superfund Site

South Plainfield, New Jersey

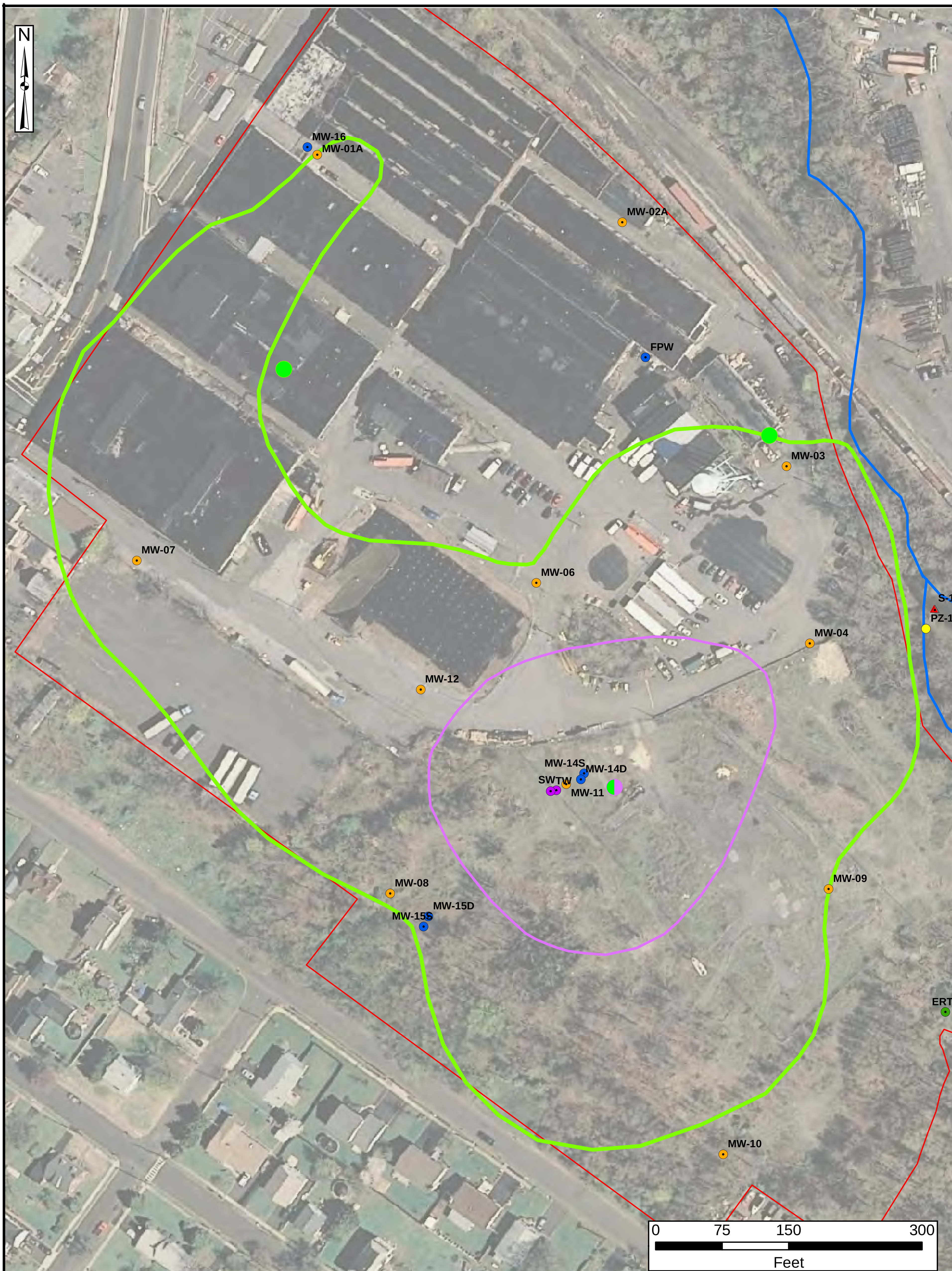
Surrounding Wellfield Locations

FIGURE 6



Note: Aqueous isoconcentration contours are conceptual in nature, and do not necessarily imply total block saturation. Colored regions should be interpretted as zones in which halo saturation is possible at the isocontour interval denoted.

ARCADIS MALCOLM PIRNIE	CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE - OU3 GROUNDWATER South Plainfield, New Jersey	HYDROGEOLOGIC CROSS SECTION (N-S) July 9, 2010 with AQUEOUS CONCENTRATION ISOCONTOURS - TRICHLOROETHENE (TCE)	FIGURE 7



Legend

*Based on March 2010 Analytical Data

Former CDE Facility	Alternatives 3A/3B Extraction Well	2009-2010 FLUTe™ Well	Staff Gage
Alternative 3A - 25,000 ug/L TVOC*	Alternative 3B Extraction Well	Shallow Bedrock Monitoring Well	Piezometer
Alternative 3B - 2,500 ug/L TVOC*	2008 FLUTe™ Well	Test Well	Bound Brook

ARCADIS MALCOLM PIRNIE

Cornell-Dubilier Electronics Superfund Site

South Plainfield, New Jersey

APPROXIMATE TREATMENT AREAS FOR ALTERNATIVES 3 AND 4

Figure 8

Map Document: G:\project\4553058\GIS\Mxds\PlumeContours_TreatArea3A3B.mxd)
4/30/2012 -- 12:05:00 PM

ATTACHMENT B
Public Notice

The Fat Tail Gecko appears to have two heads which deceives its enemies.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY INVITES PUBLIC COMMENT ON THE PROPOSED PLAN FOR THE CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE SOUTH PLAINFIELD, NEW JERSEY

The U.S. Environmental Protection Agency (EPA) announces the opening of a 30-day comment period on the preferred plan to address contaminated groundwater at the Cornell-Dubilier Electronics Superfund site in South Plainfield, New Jersey. The preferred remedy and other alternatives considered are identified in the Proposed Plan.

The comment period **begins on July 20, 2012 and ends on August 20, 2012.** As part of the public comment period, EPA will hold a public meeting **on Tuesday, August 7, 2012 at 7:00 p.m.** at the South Plainfield Senior Center, 90 Maple Avenue, South Plainfield, New Jersey.

The Proposed Plan is available electronically at the following address:
http://www.epa.gov/region02/superfund/npl/cornell/

Written comments on the Proposed Plan, postmarked no later than August 20, 2012 may be emailed to Garcia.Diego@epa.gov or mailed to Diego Garcia, U.S. EPA, 290 Broadway, 19th Floor, New York, NY 10007-1866.

The Administrative Record files are available for public review at the following information repositories:

South Plainfield Library, 2484 Plainfield Avenue, South Plainfield, New Jersey
USEPA Region 2, Superfund Records Center, 290 Broadway, 18th Floor, New York, New York

Please contact Pat Seppi, EPA's Community Involvement Coordinator, at 212-637-3679 for more information.

EPA United States Environmental Protection Agency

Newsroom

News Releases By Date

EPA Extends Public Comment Period on Plan for the Cornell-Dubilier Electronics Superfund site in South Plainfield, New Jersey

Release Date: 08/20/2012
Contact Information: Mary Mears (212) 637 3673; mears.mary@epa.gov

(New York, N.Y.) The U.S. Environmental Protection Agency is extending by thirty days the public comment period for the plan it has proposed for the contaminated ground water at the Cornell-Dubilier Electronics Superfund site in South Plainfield, New Jersey. The plan would prevent the use of contaminated ground water as a source of drinking water. The ground water associated with the site, located at 333 Hamilton Boulevard in South Plainfield, became contaminated with polychlorinated biphenyls (PCBs) and volatile organic compounds from past industrial activities. PCBs are likely cancer causing chemicals and can have serious neurological effects. Volatile organic compounds can cause serious damage to people's health.

The ground water at the Cornell-Dubilier Electronics site is contained within underground layers of rock and soil. Municipal water supply wells in Middlesex County draw ground water from some portions of the rock formations to the north of the site. The plan proposed in July will require enhanced and continued monitoring of the ground water and will prevent the contaminated site ground water from being used as a source of drinking water in the future. The Cornell-Dubilier Electronics Superfund site is part of a Borough of South Plainfield redevelopment area.

The EPA held a public meeting on August 7, 2012 to explain the proposed plan. At the request of a member of the public, the agency is extending the public comment period from its original date of August 20 to a new public comment deadline of September 20, 2012.

Cornell-Dubilier Electronics, Inc., manufactured electronics parts at the 26-acre facility from 1936 to 1962. PCBs and solvents were used in the manufacturing process and the company disposed of PCB-contaminated materials and other hazardous wastes at the facility property.

Written comments may be mailed or emailed by September 20, 2012 to:

Diego Garcia, Remedial Project Manager
U.S. Environmental Protection Agency – Region 2
290 Broadway – 19th floor
New York, NY 10007-1866
(212) 637-4947
garcia.diego@epa.gov

For more information on the Cornell-Dubilier Electronics Superfund site, please visit:http://www.epa.gov/region2/superfund/npl/cornell.

Follow EPA Region 2 on Twitter at http://twitter.com/eparegion2 and visit our Facebook page,http://www.facebook.com/eparegion2.

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Recent additions

ATTACHMENT C

Public Meeting Transcript

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
- -x

CORNELL-DUBILIER ELECTRONICS

SUPERFUND SITE PUBLIC MEETING

- -x

South Plainfield Senior Center
90 Maple Street
South Plainfield, New Jersey

August 7, 2012
7:15 o'clock p.m.

A P P E A R A N C E S:

PAT SEPPI,
Community Involvement Coordinator

JOHN PRINCE,
Section Chief-NJ Remediation Division

BECKY OFRANE,
Human Health Risk Assessor

DIEGO M. GARCIA,
Remedial Project Manager

JEFFREY FREDERICK,
Hydrologist

DIANA CUTT,
EPA

Tina DeRosa, Reporter

♀

P R O C E E D I N G S

MS. SEPPI: Well, first of all, I would like to thank you all for coming tonight to our post-plan meeting for the Cornell-Dubilier Electronics Superfund Site.

We are here to present EPA's preferred alternative for the contaminated groundwater that's at the site. We call the groundwater portion of the site Operable Unit 3 or Phase 3 and John Prince in his presentation will talk a little bit more about what that means and what our other operable units or phases are.

My name is Pat Seppi. I'm in the Public Affairs office and I'm the Community Involvement Coordinator for the Cornell site. And I would like to ask the other, my colleagues who are here tonight and involved in this site to introduce themselves also.

John.

MR. PRINCE: My name is John

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Prince. I am the Chief of the Central New Jersey section of the Superfund Program and this project is in my group.

MS. SEPPI: Diego.

MR. GARCIA: My name is Diego Garcia. I'm the Project Manager for the site.

MS. SEPPI: Rebecca.

MS. OFRANE: Rebecca Ofrane. I'm the Human Health Risk Assessor for the site.

MS. SEPPI: Diane.

MS. CUTT: I'm Diana Cutt, I'm a geologist for the EPA.

MS. SEPPI: And Jeff.

MR. FREDERICK: My name is Jeff Frederick. I'm a geologist with a private consulting firm called Arcadis and I ran the investigation of the site.

MS. SEPPI: Okay. Thank you. We also have representatives here tonight from the Middlesex Water

Company. We've been working with them. They are a valuable partner in helping us learn about the aquifers and also with stakeholder in this endeavor.

I want to remind you please there's a sign in sheet in the back if you would sign in. We do have a mailing list. Hopefully, some of you received our notification with the information about the meeting, but it's not an all inclusive mailing list and we would like to get an e-mail list started also rather than just a regular mailing list, so please don't forget to sign in.

Right now we are in the middle of what's called a 30-day public comment period for the Cornell site. It will end close of business on August 20th.

Now, you'll notice we have Tina, our stenographer, here this evening who will be recording the

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whole section and there were will be a transcript available afterwards. So your comments here tonight will become part of the record and they'll be addressed in what we call a Responsiveness Summary a little later in the process when we have our final record of decision.

So if you should leave here tonight or know of anybody else who might have comments or you have additional comments that you think of after you leave, certainly send those comments to Diego who is the Project

Manager and his address and name and number is on the proposed plan if you have that. Hopefully, you have a link to that. And if not I have a couple announcements up here that has our website on it as well as Diego's information. So remember, close of business August 20th is the last day to get your comments in.

One thing I would like to ask.

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We have our presentation. It should be about 45 minutes. I know that sounds like a long time, but it's a complex presentation. It's a lot of information to go over. So I would ask, if possible, if you could hold your questions until the end of the presentation. I know sometimes that's difficult, but what usually happens or what sometimes happens is your questions will get answered as part of whoever is presenting. So if you could do that I would certainly appreciate it.

So I think at this point I will turn the microphone over to John Prince. He is going to give you a little bit history of the site and also an overview.

John.

MR. PRINCE: Thank you, Pat.

Thank you all for coming. We really do appreciate your time.

Jeff and I are going to do a

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presentation about -- about the Cornell site in general focusing in particular on the groundwater. And so I will describe a little bit about the Superfund process, speak to you about the site in sort of a big general way.

Jeff will speak about the technical details of the investigations of the groundwater that we have performed and then turn it back over to me and I'll be describing some of the challenges that we face here and how we plan to address them.

And then the important part of the evening will actually be opening it up to the community so that you'll have an opportunity to ask us questions. We'll do our best to answer them, but also get your oral comments into -- into the record.

So this is our standard sort of picture of how the Superfund process works and I'm not going to really delve into it in a lot of

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detail beyond describing just a couple of things.

The Superfund Program is really two separate, but interrelated programs, an emergency response program and then a long-term remediation program. That's the phase that we're in now that takes on these larger Superfund sites and develops final permanent solutions to them. That's the goal of the remedial side of the project.

Emergency response, we call that the removal program. It doesn't always remove something, but the idea is that we are separating individuals, community members, potentially exposed people or environmental settings from hazards that we might know about. Some drums we might remove or putting up fences, providing drinking water to someone who might be found to have a private well that has some contamination in it.

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So I'll tell you a little bit

more about the Superfund process by telling you a little bit about -- about Cornell.

So Cornell-Dubilier Electronics began work here in South Plainfield in about 1936 and they were here until the early 1960's. They occupied a facility that was already built and factory at Hamilton Boulevard and New Market Avenue, a 26-acre facility and were you to be -- prior to the about 2007 the factory was still there.

They were in the business primarily of manufacturing electrical components, but in particular electrical capacitors which are used in a lot of different settings from radios to power -- power grid related units that are up on telephones poles and such.

And all those capacitors needed some sort of what's called a

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dielectric fluid or a dielectric boundary to work and an excellent dielectric fluid is something called polychlorinated biphenyls or PCB's and so they used a lot of them at that facility and were in the -- and ended up disposing of a lot of them at that facility by the time they had left.

Now, if anyone has been to a presentation about the Cornell site before you have heard us talk about PCB's. We talk about a PCB's a lot here because this is really a PCB site.

However -- oh, I'm sorry, one other thing about PCB's. They were discontinued from use in the late 1970's. So we don't use them anymore, but they are quite durable. They stay around in the environment a long time and they're a suspected human carcinogen which is why they are no longer used.

Another chemical -- but the

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other thing about PCB's is that they are not very soluble in water. So when it comes to looking at the groundwater, while we do have some PCB's in the groundwater there are other chemicals, in particular one called trichloroethylene or TCE that Cornell used in great quantities and it's sort of a second contaminant and it is substantially more soluble in water than PCB's and so when we are looking at in the groundwater we start focusing instead of PCB's on the TCE because the results has been it's much more widespread at the site.

So I'm going to take a couple minutes, I've got some boards up here to orient all of us to the different pieces of the site and I might walk around a little bit because it will help if I sort of gesture at the board.

Just south of here across the Hamilton Boulevard is the 26-acre

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former CDE facility and that's a piece of our cleanup. If you, let's see -- when EPA started work on the project back in the late 1990's the first thing that we did were some of those emergency response actions that I was describing earlier.

Took some actions at that facility. Required some paving and some fencing to isolate people from areas that were contaminated, but the other thing that we were finding out there was that there were a few residents particularly across the street on Spicer Avenue that had some low levels of PCB's either in the soils or in dust actually in the houses.

So some of the early emergency response actions were to clean those houses and clean up, dig up some of the surface soils that we had found that had those PCB's from some of those lots.

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So that when we started working on the site, it got placed on the Superfund list. We started looking at the big picture, what sort of remedies might we look at for the site. We started there. We picked up where those activities had left off. And that's what we call Operable Unit 1 and you all might wish to come up at some point and take a look at this figure.

Here's the former facility and we evaluated, we have started here very close to the facility and did a lot of testing of residencies around the facility and then also across the Bound Brook behind the park right over here we also did some testing because, I'll get to this in a minute, we had found some PCB's in the Bound Brook itself and we were looking to see whether there might be PCB's that some how might have gotten into some of those yards.

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In 2003 we signed the first remedy for this site called record of decision. That's for these off-site properties, what we call Operable Unit 1 and we had found a few more houses. We actually at the time of the remedy found three additional lots that had some relatively low level, but elevated levels of PCB's on these private properties, and then we had some -- there was some information that we collected that suggested that there might be some other properties.

So the remedy called for us to go clean up those lots and then kind of put out -- put together a plan for doing some additional investigations at some of the other properties in the areas to try and ascertain whether there are other lots that needed to be addressed.

We have now cleaned up four properties and have identified eight

other ones. This is out of hundreds
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that we have looked at that have elevated levels of PCB's and we are actually going to start that work this month.

It will take a couple months for us to do those eight. We have about 12 more lots we are looking at where additional actions may be required, but we think that we'll be done with that phase of the work as early as 2013.

Next, Operable Unit 2. Now, we are to the facility itself, the 26-acre lot and this second figure, I don't know if any of you saw me reorganize them, but I put them in order. Unit 2 is here, the 26-acre facility.

This is a photograph before the plant was removed. In 2004 we selected a remedy for the facility. It had a number of components. 2006 we started that remedy by relocating all of the tenants, business tenants
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who were using these buildings.

Demolished all the building and then the next phase was the removal of basically a big pit of capacitors, spent, broken capacitors that had been dumped in the back of the facility. And then starting in 2008 we brought in a treatment facility. We used a process called low temperature thermal desorption to treat contaminated soil and debris on that site to remove contaminants, the most highly contaminated levels of PCB's and trichloroethylene which we were finding in the soils on the facility.

That thermal desorption work was finished in 2011, last year and then since that time we've been capping the residues that were left over from that treatment process.

In total there were approximately 110,000 cubic yards of material that we either removed or

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treated and put back there. That's about 165,000 tons we estimate.

So that moves us on to OU 3 which is the piece we are discussing today and that's the next figure over there. You'll see a number of different pictures of that and there is certainly a number of examples that you can see from the proposed plan itself.

And then finally way over here is Operable Unit 4 and that's the Bound Brook. I have to do a little pointing here and again I encourage you to come up and take a closer look. This scale is a little difficult for the room.

The Bound Brook study is, we need to perform it because the Cornell site released PCB's into the Bound Brook and the extent of those PCB's is really the subject of that investigation.

The Cornell site is here. So

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we are sitting right here. Upriver is the Woodbrook Road site. That's in the Dismal Swamp and our studies actually begin up above the Woodbrook site in the Dismal Swamp, continue down, include portions of Spring Lake right outside the door, Bound Brook down to New Market Pond, all the way through into the Green Brook. It's over nine river miles of

investigations we are undertaking.
That work is actually near complete and we expect to be back here making a description of our findings and proposing a remedy we hope as early as next year.
So that's the big picture. I'm going to turn it over to Jeff Frederick and he's going to dig into some details about the groundwater.
I will emphasize we've got a lot of difficult science that he's going to try to capture and describe. We are trying to keep this as short as

possible.
If you are a hydrogeologist in the audience or if you are somehow an expert in environmental science you will see that we have -- that is a very high level view and we've simplified or generalized some things.
This is a very involved study. We're trying to be fair to the commenting part of the evening and not take any longer. So bear with us if it seems a little simple -- simpler than it might be.
MR. FREDERICK: Thank you. I

think he just called me simple.

Again, my name is Jeff Frederick. I'm a geologist and I led the investigation of this study. My goal tonight is to try to convey some of the key findings of our study, but also to explain some of the concepts that one needs to understand to understand where EPA comes from when they evaluate some of the remedial

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alternatives.

And as John says, due to the constraints I'm going to have to generalize some of these concepts and some of my analogies may not be perfect, but that's just because I don't have enough time and if you have questions and want to talk to me afterwards, please feel free.

The study area where we are right now is underlaying by a silt and mud stone called the Passaic formation and this is chunk of the Passaic right here.

During the course of the investigation my company and firms who investigated this site before us installed a total of 33 monitoring wells across the area and the depth of

those wells range from about 50 feet beneath the ground surface to about 600 feet beneath the ground surface.
We installed -- some of the early investigations installed kind of

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standard monitoring wells in bedrock with an open interval and they collect kind of an aggregate sample over that interval.
We installed a number of multi-port wells which have several ports at different depths so that we can collect at one location several discrete samples at different depths. So that we can characterize vertically as well as horizontally with the number of wells.
So what we encountered, first to describe the general groundwater condition across the site, in the south near the former facility here, I know it's kind of dark, we encountered groundwater at a depth of about 20 feet beneath the ground surface. Up to the north we encountered groundwater at a depth of about 40 feet beneath the ground surface.
Just a quick note on risk

because I know that is on people's

mind. My part of the investigation was to determine the nature and extent of potential contaminants.

What happens next is my results go to a risk assessor who then looks at what we found, multiplies that times the exposure pathway and comes up with a risk number, some sort of way to quantify a risk.

So based on the nature and extent of groundwater being 20 to 40 feet beneath ground surface there is no direct way to come into contact with groundwater unless you dig down into the ground or install a well and pump the water out.

So just a note on understanding when we are talking about these impacts to groundwater that unless you come into contact with that groundwater directly, that is the primary risk factors.

So these three -- these three are the same picture essentially. The

study area. But what we have done

because we have so many data is we've taken it by slices. On the left will be the shallowest groundwater encountered. In the middle will be what we call an intermediate zone, 120 to 160 feet beneath ground surface and on the far right is the deep zone, 200 to 240. And just one more quick note and I'll start rolling. We have data at depths much deeper than 240 feet. We just have less of it.

So this isn't the bottom of our investigation, but it's the deepest interval where we could confidently contour the data that we have.

So generally groundwater in the shallow bedrock kind of conforms to topography, it's what you would expect in shallow groundwater. It flows from the site to the north, discharges to Bound Brook. North of Bound Brook it generally flows to the

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west discharging to both Bound Brook, Cedar Brook, and Spring Lake.

Intermediate and deep, groundwater from the site generally flows to the northwest very briefly before arching to the north and then to the northeast due to the influence of production wells, drinking water production wells. Those production wells to the north generally dominate the hydrogeology of the entire region. So that's the lay of groundwater.

As part of our investigation we sampled all of those wells multiple times and analyzed them for 180 plus known compounds. We're going to focus tonight on those that we feel present a potential public concern, those that are most mobile and those analytes which are soluble and most mobile.

And as John mentioned in his lead in, TCE was one of those compounds. As a known human carcinogen and relatively soluble it

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is very mobile.

So here again this is TCE in groundwater shallow, intermediate, and deep. The effects that we see in shallow groundwater in the shell of bedrock are almost entirely centered on the former CDE facility.

Highest concentrations are right here at the center of the facility. These concentrations are

R2-0023132

shown in the figure in parts per billion. So a thousand parts per billion is this line here and that is the way that we express concentration.

The plume in the shallow bedrock is cut off by Bound Brook most likely because of groundwater discharging into Bound Brook. Then north of Bound Brook the plume reemerges in shallow bedrock and that's probably because the gradient groundwater is upward, north of Bound Brook. So the contamination goes under Bound Brook and comes back up on

the other side.

In the intermediate and deep depths the TCE plumes. The highest concentrations in the intermediate are north of the site as well as in the deep zone, and as we get into the deep zone the total concentrations in groundwater fall off.

So the highest concentration shallow and as we go deeper the highest concentrations get lower.

A VOICE: What's the highest concentration you found in the shallow?

MR. FREDERICK: In the shallow?
A VOICE: Yeah.
MR. FREDERICK: On site I believe it was around 150,000 parts per billion.
A VOICE: And groundwater standard for TCE is what?
MR. FREDERICK: The Federal drinking water standard, drinking

water for TCE is five parts per billion. New Jersey's standard for drinking water is one part per billion.
A VOICE: What's the level of 200 feet down parts per billion?
MR. FREDERICK: Parts for billion here?
A VOICE: Yeah.
MR. FREDERICK: This contour is a hundred and these are logarithmic contours, so I believe the concentrations in here were in the high hundreds, six, seven hundred parts per billion.
In addition to TCE we also did find PCB's in groundwater. They were however just limited to a couple of wells at the former facility footprint

here. The highest concentrations were located right at the same place where we found the highest concentrations of TCE and that is in large part probably why we are actually seeing PCB's in

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groundwater.

Note that we sampled all of these wells for PCB's and they were almost all non-detect except save this crest shape on the former facility footprint.

A VOICE: What was the highest PCB's?

MR. FREDERICK: Okay. I don't remember that number off the top of my head, but it's over a hundred. It's in the proposed plan, though.

So those are the key findings of the chemical study in groundwater for OU3. Those are the major points I would like you to take away and again I don't have a lot of time, so I want to move right on.

One of the things that makes this site a little bit different from all the other sites that I have worked on before I got into fractured rock work is that it's a fractured rock site. We are underlaying again by the

PROCEEDINGS

Passaic formation which is silt stone that is also fractured. And we are going to talk to you about some concepts and then we are going to move into -- if you like, sure, these are fine to handle.

We're going to talk about some concepts and I'm going to use the term matrix diffusion a bit as we move on. When I refer to matrix I'm talking about the rock material and diffusion I'll cover in a bit, that's the physical process of diffusion.

So Key Concept No. 1 to understanding matrix diffusion is that rocks have pore spaces. This is not a hundred percent solid because it's made of small round little particles, actually silt, right. So when you pack those together like a room full of beach balls, there is going to be open spaces between those particles and we call those pores.

And those pores can hold

PROCEEDINGS

water. So as hard it must it might be

to believe this actually has a porosity of about ten percent which means ten percent of this is void space. Even though it feels very hefty and dense ten percent of it is void space, okay.

One of the ways that porosity doesn't tell the whole story is that just because this has ten percent open space doesn't mean that water or anything else can move right through it, right. The pore spaces have to be connected to one other in order for it to transmit a chemical or water, right?

A VOICE: Is this rock contaminated?

MR. FREDERICK: No, it's not.

A VOICE: Is this rock contaminated?

MR. FREDERICK: No. No.

So the pore spaces have to be connected and when they're connected

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we call that permeability. If you think of like a sand stone, aquifer like with big pore spaces that are all connected water can flow right through that. That's permeability. This with a ten percent porosity has a very, very low permeability. Just something to point out at this point.

And I have got a little picture of a sponge up there. A sponge is a good analogy. Even though you can't squeeze this to wring it out, a sponge typically has 25 to 30 percent porosity where this has ten.

Key Concept No. 2. Rocks are brittle. Up near the surface they fracture. A common misconception about fractures in bedrock is that they are really, really big and that they transmit tons of water like a pipeline. While that does happen occasionally, that's the outlier. The more common way of rocks fracturing is

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on a micro scale.

So what we did as part of our study is we cored bore holes and looked at the fractures, literally measured the fractures in the rocks and came up with an average fracture opening of 80 microns which is about half the thickness of a human hair and so very, very tiny fractures which also have -- which also occur relatively frequently. Fractures occur about once every foot in the Passaic in our study area.

So we cored the rock. We sampled it for its physical properties. We also crushed it and analyzed it for the compounds of concern here, one of which was TCE, and what we found in the rock when we crashed it and analyzed it was that the rock even in between fractures where no fracture was present also contained TCE at concentrations very similar to what we were seeing in

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groundwater.

So that's what -- that's kind of the foundation of a matrix diffusion investigation. It's not only understanding what's in the water, but what's trapped in the rock.

So I talk about these fractures being 80 microns or so thick and occurring every foot. So what does that mean really. What that means if you have a piece of Passaic that's this size, right. This is essentially the size of a five gallon bucket, trapped in the pore spaces, in the immobile pore spaces because it's the very low permeability is half a gallon of water locked up in the pores, not mobile. And I think we point out there that is what we call the immobile domain.

In the fractures, those little 80 micron fractures occurring every foot in a piece of rock this size is this much water, four milliliters give

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or take.

So immobile domain is this much. Mobile domain, when we drill a well and we sample groundwater this is what we are sampling. This is what we don't see. All right. So the pore volume in the Passaic formation is vastly larger than the fracture volume, okay. That's kind of Key Concept No. 2. And we have got one more.

Key Concept No. 3 is the process of diffusion itself. I told you that there were pore spaces in that rock that were not hooked up to other pore spaces. So the natural question is then how does stuff get in there, right, and the answer is diffusion. The same physical process for non-scientists when you're in an office and you're sitting in your cube and you smell banana and you stand up and someone at other end of the office just peeled a banana the reason you

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are smelling that is not because there's a breeze blowing. It's because that smell has diffused air in your office.

So what drives the speed of that is how many bananas your coworker peels. If they peel ten bananas you're going to smell it much faster than if they peeled one. So what we say is the rate of diffusion is proportional to the concentration grade. There's no banana in my cube and there are ten bananas over there and it drives that smell faster throughout the office.

In the real world, let's say at the Cornell site back in the '30's when they started working there and they began dumping their solvents out the back door, right, they just dumped that stuff on the ground, the concentration, that weight solvent that they were dumping out was a billion parts per billion, right. It

was pure solvent. No analysis necessary to determine the concentration of it. It was pure solvent.

So at a billion parts per billion here and then the pore water of the Passaic formation which was zero, right, you have got a billion versus zero driving diffusion into the pore spaces of the rock.

So when this stuff hit the water table and began moving through the fracture network there was a massive diffusion gradient driving that stuff into the rock. So that is how those pore spaces which are isolated become infused with the contaminant, with TCE.

One other thing I forgot to point out on the last slide real quick. While we have an immobile domain and a mobile domain I should say that the fracture volume, that little tiny cup that I have, right,

this little four milliliters moving

through the fractures moves really, really fast. That's why we can pump a sample, collect a sample, analyze it in a lab and then come back in a couple months and do it again, right. Water is being replenished through these fractures.

So this little bit of water is moving lightening fast through this. All this water, lots of it, but it's not going to move. It's not moving fast at all. Very, very resistant to moving, okay. So the immobile domain is locked up. The mobile domain moves really fast.

So those are the three concepts that I wanted you to understand with regard to matrix diffusion. So before we started investigating fractured rock sites we would come to a site and collect our samples in unconsolidated material, find our contaminants and say okay, we

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can get rid of it. What we'll do is we'll identify the source area, we'll drill a well, and we'll just start pumping, right. We will remove mass and this is analogous to that.

See, I dump that soap on there. It soaked in really fast driven by in part the same thing that drives diffusion deep concentration grading.

So you come in and you just start pumping groundwater out and after a while you pull in clean water that flushes the core volume and after, you know, years of flushing pore volume after pore volume you end up extracting the contamination from the ground and this, there coupled with a couple of other technologies was how this was done. A standard pump and treat approach to cleaning up groundwater.

The ways in which this sponge and those scenarios are different, we

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just discussed.

First the Passaic formation as I said, has a huge immobile domain. That half gallon of water is locked up in pore spaces that are not very permeable.

Second, the concentration gradient which will drive diffusion back out of those pore spaces today is really, really small, okay. So if I were to pump groundwater through the Passaic and clean up those fractures really quickly what might I expect. I build my system. I run it for three years and I believe you would see clean water in no time, probably two or three years. And then you turn the system off and you wait six months. You sample it again and the concentrations will be exactly what they were before you started because the rock, like that sponge, has become a reservoir holding that contamination in the immobile pore spaces of the

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rock.

And so every time you pass a clean pore water volume through this very, very small fracture system, right, I can pump this out. I can clean this and I can make it, you know, clean. All I'm doing is setting up a very small gradient for this mass to diffuse into my small fracture again and again and again. And because that gradient is so low the rate of diffusion which we described earlier would be very, very low as well, okay.

So back to my example. If we were to build a pump and treat and do that and we would see that rebound and we would do it again and we would see the rebound after we started pumping. We could do that for centuries and never see any appreciable removal of mass.

MR. CHAPIN: It's similar to the groundwater drinking wells, right,

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that are pumping for the drinking water right now, that are drawing these contaminants in. Instead of you doing the cleanup you are going to let centuries of people drinking water and water customers pay for the cleanup of the toxic waste. That's exactly what you're talking about, right, what the drinking water wells are doing just that, aren't they?

MR. FREDERICK: If the drinking water well weren't pumping which is what I was going to say next, if they weren't pumping, imagine nobody is pumping, Groundwater still moves. The gradient would be slightly less, but the clean groundwater that would come from the south and for out site and flow to the north would still move through those fractures and it would still set up that small concentration gradient which diffuses that mass into the fractures and that would occur over a period

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of centauries as well.

MR. CHAPIN: What is the basis for centuries?

MR. FREDERICK: The basis?

MR. CHAPIN: Yes. You are saying it's going to take centuries. How did you compute that the mass that was in the rock would take centuries to diffuse out. How did you do that?

MR. FREDERICK: That is a longer story than I have time for. I would be happy to talk to you about it after. I will say that we have studied this phenomenon at different sites around the country. We have attempted remedies like this. I might as well go there now.

Like in-situ chemical oxidation, like bioremediation, we have tried these and what we see over and over again is it looks like it's working, it looks like it's working. We get excited. We stop injecting peroxide or chemical oxidant or

pumping. Two, three, four months later it rebounds right back to where it is.

So we understand the phenomenon and from there we can model it and show that because we know the small processes that control diffusion we can model over a very long time what is likely to occur. I can't tell you with a hundred percent certainty that I know, but I can tell you with 99.9 percent certainty that I'm certain.

MR. CHAPIN: You are sure your model is valid?

MR. FREDERICK: Yes, I am.

MS. SEPPI: I'm sorry, I don't mean to interrupt, but I did -- that's fine and you had good questions, but I just would need you to give your name to our stenographer, so we make sure that we have your comment.

MR. CHAPIN: I'm sorry.

MS. SEPPI: I was going to say

that at the end when it was time for

questions and answers. But if you could just give her your name.

MR. CHAPIN: My name is Richard Chapin, C-H-A-P-I-N.

MS. SEPPI: Thank you.

MR. CHAPIN: I'm a licensed professional engineer and Board-certified engineer and I have done some review and I have prepared some comments on behalf of Edison Wetlands.

MR. FREDERICK: We'll talk more after.

And lastly while we're talking about potential remedies and their shortcomings, thermal remedies are also a class of technology that could potentially treat this. On a small scale it's been done and I mean a small scale it's been done, but on a scale of OU 3, our study area, some 825 acres nothing like that has ever been tried.

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What's more thermal remedies involve the drilling and installation of heating elements in the groundwater. There would be thousands of essentially toaster elements in the

ground drawing electricity and boiling
the groundwater.
John will talk more about some of the shortcomings of this remedy, thermal approach that is, when he takes back over.
So EPA's goal in Superfund is to clean sites up and restore aquifer to the best and highest use, right. That is the goal and, you know, I work for an engineering firm and that is our goal, too. That is what we do for a living.
So if I felt that there was a good way or a good remedy that we could sell here, you know, in a capitalist sense we would, but we've looked hard at the science and we can't say that.

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So, in short, remediating the thousands of pounds that are locked up in the immobile core spaces of bedrock is technically impracticable and when we go the route of technical impracticability what we have to do is draw a line like this on the map and say everything, all of the groundwater within that blue line will not achieve or will not reach MCL's in a

reasonable timeframe with an active remedial approach.

MR. CHAPIN: So will it ever. Will it ever. If it's not practical to do it in an engineering approach which is to speed up the natural process which that's what we are doing when we apply any engineering solution to either of those. If we can't do it with that, then it will never be done, is that the end of the story?

MR. FREDERICK: No. John is going to talk more about a kind of -- because he is going to get into the FS

itself, feasibility study, where we evaluate these, right, John.

So what I'll say is that what we have here is a predicament with outcomes as opposed to a problem with solutions which is how we are used to thinking about these. And so the way we evaluate our remedial options and the way we manage the site is really a choice of outcomes and with that I think I'll hand it over to John and he will touch more on the remedial options later in his talk.

MR. PRINCE: Okay. So when we

are faced with a circumstance where the available technologies for cleanup are not sufficient to clean up the aquifer we call that, the term is technical impracticability, but that's not the end of the story.

In those circumstances EPA has an approach, a policy approach for addressing these sites, and it has three critical elements which I will

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go through.

The first is to protect human health. The second is to address sources. If we can get at some of the sources of contamination and remove them, it's our responsibility to do that to the extent that that's achievable. And then the third item is, the phrase we use is plumer mediation, aqueous plumer mediation. So this is the area, if you look at the OU3 figure which is the second one over there, within that zone where we don't think we can recover it, recover the groundwater, that's one area. But if there are areas outside that zone where we think we can do restoration or recovery we are obliged to try that.

Now, in this particular case the plume, the contaminants are released so long ago and the age of the plume has gotten to sort of a point where we actually don't think it

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is getting any larger. We think that it's reached the maximum of its extent and I'll touch on that a little bit more as we go through the end of the presentation.

With regard to protecting human health, now we're talking about measuring -- you know, what does that mean. It means now we are talking about evaluating risk, human health risk. And we have in the Superfund Program a way to quantify exposure hazard as a quantifiable risk. You need these components, though, you need to have a hazard and you need to be able to be exposed to that hazard and the combination of those two represent risk.

At most cleanups what we do is we focus on addressing the hazard. We'll get rid of the hazard. We will remove the contaminants, in this case TCE in groundwater. We'll get that stuff out. That's how we'll solve our

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risk issue.
In this case we're faced with a hazard that is out of reach. So instead we need to focus on exposure and so that risk, that same risk assessment process allows us to evaluate what those exposures might be, and for TCE in groundwater they are primarily drinking water, vapor intrusion which I will explain and then I have grouped together a couple of other possible exposures that we can, that I'm going to sort of lay out there partly so that it might help with the discussion later.
With regard to drinking water, all of the study area that we have been referring to has available a public water supply. So we are not really focusing on the public water supply as much as are there wells, private wells out there where people might be using that water. But before I -- I don't want to leave the

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public water resources without

mentioning that a little bit.

In these communities there are basically two companies that provide public water, New Jersey American Water and Middlesex Water Company, and among those two they use available resources. They use surface water. They use pumping wells from wells in the area including Passaic formation and I don't want anyone to -- I hope no one is surprised to learn that in the urban northeast those resources require treatment for use. And sometimes what needs to be treated is TCE similar to what we have here, not necessarily because of the Cornell site, but because that's where we live.

And so those companies have responsibilities to -- they're regulated, they have responsibilities to meet water quality standards, State and Federal. They have regulators to

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whom they need to report and that's where your tap water comes from.

We are also in the process here of trying to identify where there might be any private wells, and in

particular we're interested in private
wells that might be in our target zone
where we've identified contaminants.
For those -- for that process we have
gone through a number of steps
including first and foremost going to
the State of New Jersey who keeps a
registry of wells that have been
installed in the state. That registry
is quite old. It covers many, many
wells.

We used a radius of a mile
from the site and identified about 50
wells that are in that registry,
private wells of one sort or another.
A number of them are business,
associated with businesses, and then a
number of them are listed as private
wells at homes.

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We were able to visit 40 of
those locations and the reason we
couldn't visit the other ones is
because the State's database is
imperfect and some of the locations
that they have listed in their
database are simply a street name
without an address and so we are
limited at this stage as to not being
able to get to every one of those

locations.

The ones that we did visit I can tell you about and we visited 40 locales. We did find one well and it is at a residence and it is being used. It is not in our study area. It's actually the other direction. We tested it anyway, didn't find any contaminants, and all of the other wells nothing -- no one should be surprised by this are locations where we couldn't find anything.

In general the residents didn't know there was a well and in

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some cases they knew there had been at one point.

We did get -- open a dialogue with each of those residents because we want to find wells like that and we were not too surprised to find that the state's database, these wells are quite old. They went into the database a long time ago before there was an electronic database was when these wells were installed.

MR. SPIEGEL: And nobody has contacted you that a private well, that was something that was site related that asked EPA to look a little further.

MS. SEPPI: Would you state your name, please.

MR. SPIEGEL: Robert Spiegel, Edison Wetlands.

MR. PRINCE: I didn't get quite what you said, but I think I'm answering your question.

MR. SPIEGEL: You're saying,

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you're talking about drinking water wells. I'm asking you has EPA been contacted by any residents to discuss potential site related contaminants outside of your contamination study where site related contaminants were found in a private drinking well?

MR. PRINCE: Aside from the wells -- I can answer that, yes. Aside from the wells that I'm describing that we got right out of the registry we have sampled several other wells that are not actually in this study zone and that was done a bit earlier in the process, essentially because we didn't exactly know what the extent was. So we have sampled some other wells.

I don't want you to leave here

with the assumption that we think we're finished looking for private wells and if anyone has any information about a private well, knows of someone who has one we would

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like to talk to them. We would like to talk to you. So please consider this a request from us and if you have got some information let's talk after the meeting.

MR. DIEGNAN: Can't you just cross reference the folks that don't get water -- I'm Patrick Diegnan.

MS. SEPPI: Thank you.

MR. DIEGNAN: Can't you cross reference from folks that don't get water bills. Isn't that public information Middlesex Water.

MR. GARCIA: We reached out to Middlesex Water and they gave us a list, a very small list.

MR. PRINCE: We actually did speak to Middlesex Water which is where that area is and did cross reference against a list that they produced, so. And we have spoken to the borough. We have tried to reach out to things we can think of, including that, so yes.

MR. DIEGNAN: So what did that disclose?
MR. PRINCE: It didn't add anything to our list.
MR. DIEGNAN: So to your knowledge you identified all existing wells?
MR. PRINCE: We have done everything that we can think of and we are ready to look at other resources if anyone has other suggestions.
Yes, ma'am. Can you state your name?
MS. BLUE: Dorothy Blue.
I live just outside of that zone, but I don't drink tap water. But can the exposure still happen by showering?
MR. PRINCE: We're going to talk -- we're going to talk about that.
MS. BLUE: Okay.
MR. PRINCE: So next in our list of possible exposures, vapor

intrusion.

Now, when we speak of vapor intrusion we're -- what I want you to imagine is that the shallowest groundwater where this is, say, 20 feet down into the ground, where if that shallowest groundwater is contaminated this TCE or other volatiles can actually preferentially evaporate off the surface of that water even though it's down in the soil.

And when it does so it can actually migrate up through the soils and reach the surface. Now, if it reaches the ground surface it simply dissipates, it's very volatile and evaporates into the air, not measurable.

If it encounters a structure, however, if it encounters a basement or some other enclosed space and it can get in, there is a potential that it can actually build up and if that

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basement or that lower space is used there could be a sustained exposure to that material.

So here we have hazard, potential exposure, there may be a risk. So we've done vapor intrusion evaluations at this site and let's look at the next figure, Jeff. This is a blow-up of a figure that Jeff was showing earlier and I will just point out that here's the facility, okay, and here's the area where the groundwater is actually, the shallow groundwater is contaminated.

So let me just describe it in a slightly different way. As we go further away from the site the ground -- the TCE, and actually all of these constituents are heavier than water and they are sinking as they move away.

And so as we get further away from the site we find that the shallowest groundwater is actually

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cleaner and the contaminants are deeper. So we've got these areas -- this area here where the groundwater is actually shallow and contaminated and then just across the Bound Brook, essentially Veterans Memorial Park area.

So we have done testing of lots in those areas and actually in some of these we did a couple of houses down here as well to try and identify whether there were houses with this issue. We did find two. One of those houses is actually some blocks away in the wrong direction with regard to groundwater. As the groundwater is going this way these wells down here are clean and we have a house down here that has some TCE underneath the basement slab. So that means that it's actually -- here's the basement. We sampled below the basement and we got some detection.

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MR. CHAPIN: What does that tell you. That tells you you don't have the plume fully, you know, fully defined.

MR. PRINCE: We believed we do have the plume fully understood and we do not know why there is TCE in this house.

MR. CHAPIN: It's not a vitamin. It's not naturally occurring.

MR. PRINCE: There was no TCE in the house. There was a detection beneath the slab. The TCE is more common than maybe it should be and it may not be coming from this site at all.

The other property has PCE which is perchloroethylene, not associated with Cornell site at all, and it's again beneath the slab, not in the house, and we have referred that property to DEP.

Rich, you have something you

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would like to add.

MR. CHAPIN: Just a question. The documents, there is a lot of reference that any PCE is not associated with Cornell's TCE.

MR. PRINCE: Yes.

MR. CHAPIN: We are not talking about (inaudible) chemicals here. We're talking about run of the mill industrial chemicals that are not necessarily pure. When you chlorate those molecules you don't produce any PCE as a trace contaminant in the TCE. I believe you do.

MR. PRINCE: The site data is what it is. You can look at the data. It will tell you whether there was PCE that was discharged at the Cornell site.

MR. CHAPIN: Was there?
MR. PRINCE: No evidence of it.
MR. CHAPIN: Is there PCE at the Cornell site?

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MR. PRINCE: No.
MR. CHAPIN: Not at all?
MR. PRINCE: No.
MR. CHAPIN: That's good.
MR. PRINCE: So the other houses that we tested, we didn't find anything. And those were again in, out into this community over here. So nothing under the slab, nothing in the soil, gas.
Again, I don't want to give you the impression that we are finished with all the vapor intrusion testing. We consider this a plausible exposure pathway. It could happen. Conditions could change.
So our expectation is that we will need to -- to be vigilant about this issue.
A VOICE: How many homes did you test?
MR. PRINCE: Twenty-five.
A VOICE: Twenty-five total?

MR. PRINCE: So let's go on to

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the next one. I don't want to leave off with the impression that it's just drinking water and vapor intrusion. Although those are the primary concerns that we have.

If someone had a private well and they were using it for something else, not drinking water, but, say, watering their lawn or washing their car, filling a swimming pool, we would like to know about that because they are creating a condition where they might be exposed to something depending on how they use the well.

So, please, if someone has got drinking water, but still has a well we would like to know about that and we would evaluate it on a case by case basis. But I do want to make an observation that because TCE is so evaporative, it goes into the atmosphere so quickly, someone using that well and washing their car and having it hit the sidewalk and run

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onto the street we do not consider a

public health concern. It's not a concern for the neighborhood because it's going to evaporate too quickly to result in any sort of lasting issue.

But someone washing their car every day or frequently it could be getting some kind of a sustained exposure and that gets, ma'am, to your question about hey, if I'm showering and that is the water I shower with and I shower every day that's an exposure. We would like to know about that, speak to that person.

At this stage it's a hypothetical well because we haven't found it, but if that well were out there we would like to know.

MR. SPIEGEL: What about the children playing in the brook. This is the first time you have ever disclosed that you have TCE discharging into the Bound Brook and children play in there.

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MR. PRINCE: And then the last thing I wanted to bring up was the Bound Brook. Thank you. The Bound Brook is an area where we have -- we believe that there are discharges of groundwater into the Bound Brook based on the fact that there are wells nearby that have constituents in them.

And those wells are also wells that may have PCB's in them. I mean the wells are nearby the brook, some of them have PCB's in them. So we are currently in the field as part of the Operable Unit 4 Bound Brook study collecting data in the brook to try and determine whether that's actually true.

We're trying to measure that zone just below the brook right before the groundwater would discharge into it to see whether there our constituents in it. Those samples are being collected this month actually.

So as part of Operable Unit 4

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study the next study of the Bound Brook we are going to be able to evaluate whether there is an exposure to a user of that brook, someone who is as Bob Spiegel has suggested, is in the brook playing and might be exposed.

I do want to say, and I should have said this earlier when I started talking about Bound Brook, there is a fishing advisory for all of Bound Brook. It's not do not eat any of the fish that are pulled out of Bound Brook. The fact that -- those conditions are because of PCB's that we already know are there in certain sections of it and we will evaluate whether there are PCB's that might be getting into the brook and as part of our study and then we will also look at VOC's that might also be discharging and determine whether TCE or something else might pose some sort of a risk. Okay.

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So remember my three critical elements. We've only talked about one. We'll go through the others relatively quickly. The second is we're supposed to clean up sources when we can identify them and do something about it. And then, next, when we are thinking about sources we're typically thinking about something like the Cornell site itself, that 26-acre facility.

So our efforts there to address contaminated soils down to as deep as about 15 feet into the ground surface all the way to the bedrock was partly so that we could excavate out TCE contaminated soil and debris and PCB's that we think would have been acting as a continuing source. That work is finished.

As part of this action we have also looked at some cleanup options that might be applicable to try and address some of the higher

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concentration areas of the plume, the TCE plume and I'm going to get back to that in a minute, but that's Alternatives 3 and 4.

Again, the third element that our guidance asked us to address at these technical and practicability sites is whether the plume might be expanding into new areas that are not contaminated. And based on the data that we have collected, models that we have used to evaluate the scope of this problem, we don't think that the plume is actually expanding today. We think that it has essentially reached a kind of a status quo because of its age, it's sort of gotten about as big as it can get.

Let me talk about the

alternatives that we looked at and then we're almost finished.

Four alternatives. Alternative 1, no action. We're always required to look at no action

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as a way of describing what would happen as if we didn't do anything.

Alternative 2 is simple and it's manage that exposure, those exposure pathways that we described before. So monitoring the scope of the plume. Demonstrating, verifying, in fact, it's not -- the plume isn't growing, it's not getting bigger. Understanding when changes might happen to that aquifer like different pumping regimes from various pumping centers, how that might change and then try and identify vapor intrusion concerns or other possible uses and then that also includes creating some legal boundaries to putting new wells into the area to prevent people coming in contact with the material.

Then Alternatives 3 and 4 are really an effort for us to try and evaluate in sort of an engineering way whether there is something else we might do that would aid in the cleanup

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of the groundwater. Is there something that we can do that might improve those conditions. Go to the next slide.

Alternatives 3 and 4 both look at not this whole area, it's not our whole area. We're focusing on the site area and the reason we're focusing is on the site area is because the concentrations are really much higher there, ten to even a hundred times greater in this once concentrated zone. And so the goal of these alternatives is to really take a look at that and say well, what can we do about that. All right.

And our goal here in evaluating alternatives, the sort of expectation of their performance is this. If we can take that piece out of the equation, remove that contamination problem, does that help the rest of the aquifer. Does it start to recover. Does it start to

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restore such that maybe someplace down

here over time we might start to see some recovery. And by recovery I mean starting to head towards the cleanup goals, the drinking water standards. And Alternatives 3 and 4 do it in very different ways. Alternative 3 is simple. It's hydraulic contaminant. It's putting in that well that Jeff was describing before, a series of wells actually, and pumping out the aquifer.

And what that does is by drawing water out it prevents the contaminants, they may still be locked in the rock and not accessible to us, but it prevents those contaminants from leaving that area.

Whatever the influence of those wells are they're not going to go anywhere. And the reason that they won't go anywhere is because they are trapped in the rock. For them to -- if they get out of the pore spaces and

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into the fractures by diffusion they have to get to the fractures before they can leave that area. So then we would be capturing that and pulling that up. So that's simple. Withdraw the water, treat it, and the plan would be to discharge into Bound Brook.

As simple as that is, Alternative 4 is complicated and the goal is to use a thermal treatment process to try and actually essentially cook the TCE out of the rock again. And it would involve installing lots and lots of electrodes that would heat the rock to approximately the boiling point of water. The VOC's, the TCE would actually boil out of the rock and we would then need to be able to capture that.

There is a reason why there is a limited area that we can work because we really need to be able to

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capture those vapors and so it needs to be kind of an open space. You can't do it much beyond the limits of the site area.

So let me just touch on OU 3, I mean Alternative 3 and Alternative 4.

The main concern, the main issue with Alternative 3, the pumping alternative, is that it really isn't removing mass. So in ten years, 50 years we turn off those wells and the conditions will be pretty similar to the way they are now.

So for that period of time we will have been controlling the movement of those constituents out of that zone. It's relatively limited effectiveness beyond that.

The issue with Alternative 4 is really the technical complexity of it. There's an experimental effort to do this sort of technology in New Jersey right now and they're working

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on a space that's substantially smaller than this room and they're working on it. It's very complicated. They haven't shown a lot of success.

It's been tried in some other settings. This is simply a local effort. That's why I'm citing it and it's never been tried even on the scale of the smallest thing that we looked at which was in the neighborhood of something a little over $20 million for something on the scale of about two to three acres.

So that's all on the site.

It's the area that is the most highly contaminated to about 60, 70 feet down into the ground. We think it's going to remove a lot of the mass. It's going to remove the TCE. It's not going to do anything about the PCB's. The temperatures required for PCB's are much, much greater and they can't be achieved in the aquifer for some other technical reasons.

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So these are -- these are limitations, but the real limitation is this and that is we have done some very sophisticated modeling of the future conditions, what we expect to see in this aquifer over time and looking out, and so what we can do in that sort of mathematical modeling realm is assume that we're a hundred percent successful. We take out this piece.

Now, this, let's assume that this is all cleaned up. What happens in the rest of the aquifer and because it's moved, these contaminants have moved out there and have this issue of having the contaminants really bound up in the core spaces, us doing something on the site doesn't get any of that area any closer to cleanup within any of our timeframes, and then we're talking about I think we went out 200 years. It essentially changes nothing in terms of there being not

any restoration, okay.

Now, that doesn't mean at least under Alternative 4 we wouldn't be removing some mass if we were to do that. So there is some value here.

And so the question we're faced with if we can't really measure the value, but there may be some value by removing that mass, is it worthwhile. Is it a worthwhile investment in the groundwater.

We have concluded that it is not a worthwhile investment for this groundwater and so we're actually recommending Alternative 2 which is an approach that is simple and will prevent exposure to the water.

We are -- we would put in place legal boundaries to putting in new wells. We would do monitoring to assure that the assumptions that we've made are correct and that's really the sort of the -- oh, and we'd keep monitoring for vapor intrusion. We

would keep monitoring the extent of the plume, but would not be taking an active remedy to try to even address that hot spot.

This is some of the key elements of Alternative 2. And then I did want to highlight again that on my last slide that the Bound Brook investigation is ongoing. And so there are still some questions that we have related to the groundwater.

MR. SPIEGEL: How could you make this decision until you know whether or not this is discharging into the Bound Brook. How can you decide not to clean it up before you know for certain whether or not you have an active seep?

MR. FREDERICK: This is a very good question, Bob. And I'll just repeat it is, so we have with this one sort of issue that's really kind of an unknown. Well, how much material is actually getting into the brook and

how significant is that.

We can tell you we know basically a stretch, it's a relatively small stretch of the brook and we could have waited for the whole of the investigation to complete that one piece.

However, it is really related to risk assessments that we're doing in the Bound Brook itself. It's really a separate evaluation of exposures that might happen and it really, if you look at the area of the whole of the groundwater that we have been evaluating and then you look at this little stretch of the Bound Brook that may or may not be affected by constituents that are getting into the groundwater, it's a very small territory and really is not going to affect the big picture, the whole of the groundwater issue that we have been describing today.

It doesn't mean that we might

not be back to talk about some issues related to the groundwater in a year from now when we are talking about OU 4.

MS. SEPPI: There is one more

slide. I was just going to say this is Diego who is the Project Manager. His phone number and his e-mail address again if you have any more comments after tonight, you go back and think of some you can certainly e-mail them to him.

And the last day that we can accept these comments would be August 20th and there's also a piece of paper up here the flier that we sent out has this information on it also so you can copy it down here.

What I would like to do, I appreciate your patience, I know this was a long presentation, but again it's a very complicated site.

So now I would like to open it up to the most part, your questions.

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Just a couple things. Tina, are you okay, you don't need a break or anything. But if you wouldn't mind stating your name before you asked your question. That way we'll make sure that we have your comment with your name as part of the record.

So I think what I'll do is put the microphone out into the middle of the floor then. Anybody who has a question can come up and state it in the mike and everybody will be able to hear your questions, okay. So let me just move this out. What a surprise, you're first.

MR. SPIEGEL: You guys were actually first.

My name is Robert Spiegel, I'm Executive Director of the Edison Wetlands Association. I'm kind of surprised at the post-plan because we've been talking about the Bound Brook for quite some time and never once did the EPA disclose that the

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groundwater was likely discharging from the site into the Bound Brook when we were talking about the studies.

When did EPA begin the actual work here at Cornell. What year did they start investigating the site?

MR. PRINCE: The first removal actions were 1996. It started it in '96, so the studies associated with those started about '96, actually '97 to 2000 were the majority of the removal.

MR. SPIEGEL: So it's 2012.

So you have been looking at this for 20 years, give or take almost 20 years, 21 years, is that correct. EPA has been kind of at the site for 21 years now and if my math is correct and tonight you have come after 21 years to say that you are not going to do anything for another 30.

And that doesn't seem that you're doing justice to the residents.

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Even the most minimal of cleanup which addresses the stuff directly at the site, EPA is not going to do and it clearly is a cost issue because EPA is under tremendous stress and they have a lot of sites that need remediation and very small pots of money to do it.

If EPA doesn't have the resources to do all the cleanups I think you would be better served telling the people that and coming back when you do have resources and do a remediation instead of coming forward with this plan that essentially does nothing and does less than nothing because, you know, we don't know who is, in fact, potentially drinking the groundwater.

And as Assemblyman Diegnan had

said earlier, you know, there is common sense ways to actually assess that. Simply preparing the people who get water bills was an excellent idea. I never thought of that before, but

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certainly I'm sure there's others as well.

It seems to me though that a process that popped into my head as I heard you talk repeatedly about how this rock is so tightly bound that you can't get to the mass of the material that's here and it's deep in many areas that perhaps a process like hydrofracking where they break the rock and go to extract the chemicals using something that's non-toxic might be something worth exploring because that is exactly how they release the natural gas from deep shale is hydrofracking, is fracking, breaking to release that gas so they can refrack it.

Perhaps some kind of feasibility could be conducted to see if that's a process that could be done using non-toxic materials that could break some of these rock formations and release these chemicals. Because

clearly these chemicals are being released, they are being found in the levels and the wells that were being used for drinking water. So they are not so tightly bound that they are not mobile. These chemicals are mobile; aren't they, John, to some extent, right?

MR. PRINCE: To some extent, absolutely.

MR. SPIEGEL: So why can't EPA look at a process similar to like hydrofracking to try and break some of these rock formations and use them to extract the chemicals and pump them out similar to the way they look for natural gas.

Is there a process or has EPA looked at that as a potential process that could be brought in here. You have experts around the country that do hydrofracking that could be looked at as a way to address this very, very large plume, 800 plus acres is

probably the largest plume I've seen.

Is that the largest that you know of, that you have worked with?

MR. PRINCE: No.

MR. SPIEGEL: So you have worked with larger plumes than this?

MR. PRINCE: Yes.

MR. SPIEGEL: And you have worked with larger plumes where EPA has not taken an action?

MR. PRINCE: Yes. And smaller ones, too.

MR. SPIEGEL: And have they been where you have such a dense population?

MR. PRINCE: Well, it's a little difficult to just compare sites just like that. I'm not sure that I could cite an example of a site with a comparable population because I don't know the details of population density and everything.

I'm sorry, go ahead, Bob.

MR. SPIEGEL: That's all

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right. I had just a couple other quick questions.

So does the fact that you now are saying that the groundwater discharges into the surface water bodies explain the levels of PCB's that you have said in the past you know that are in Spring Lake that they couldn't explain. Did the fact that this groundwater you're now saying is discharging to Spring Lake, is that now a potential source of the PCB's?

MR. PRINCE: We don't think so. We don't think that's at all likely because the wells where we have found PCB's are all essentially at the site and the Spring Lake area is substantially far away from those wells such that transport of PCB's, you have if have got clean wells in between and you understand the nature of the aquifer there isn't -- there isn't a route for it to sort of sneak there somehow.

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MR. SPIEGEL: So that's still unexplained how those PCB's are getting into --

MR. PRINCE: We have seen some elevated levels of PCB's in Spring Lake. We have done some testing above Spring Lake to try and understand how that might be occurring and those -- and those findings will be part of our OU 4 study.

MR. SPIEGEL: Just two more questions. One is around the ubiquitousness around the ground and the stone that you guys are saying is tightly binding this material.

Are you extrapolating on data and saying that you know that this 800 acres of ground here is, that the rock is ubiquitous. It's the same throughout the whole 800 acres?

MR. PRINCE: Yes.

MR. SPIEGEL: And are you basing that on data?

MR. PRINCE: Yes.

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MR. SPIEGEL: And how many samples has the EPA taken of the rock borings in the deep bedrock to base this 800 acre --

MR. PRINCE: You're asking two different questions, but I will do my best to tie them together.

The first question is, is the rock formation the same throughout and the answer is yes. And that's based on cores that we've collected through the whole of the rock formation that indicate that we find the Passaic, it looks similar to that with small variations throughout all of the areas that we tested.

The separate question is we have collected these rock cores. Literally we pull rock core out of the ground. We slice it very thinly and take samples of the rock and measure for constituents in the rock itself because now we're not talking about the water that we can get out the

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fractures. We're talking about the water that actually trapped in the rocks. We did in four of those wells.

MR. SPIEGEL: In 800 acres?

MR. PRINCE: Within the 800 acres.

MR. SPIEGEL: And that's enough.

MR. PRINCE: We collected in those four cores about 400 data points.

MS. CUTT: 465.

MR. PRINCE: Thank you, Diana.

465 data points. So that's the number of slices, right. And each of those data points was measured for all of these constituents in the rock.

So we have identified zones where it's very clear that all that core space is -- all that core space is loaded with those constituents inside the fractures similar to what's in the rock.

We have then taken that data

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and used the other groundwater data, the fracture data to project the extent to which this is an occurrence throughout the aquifer.

MR. SPIEGEL: And just last question about the Bound Brook. It says here on Page 8 that the OU 3 RI strongly suggests evidence of upwelling groundwater discharging to the Bound Brook. Shallow wells adjacent to the brook suggest contaminant discharge to the brook from the groundwater. And it also speaks to seep samples.

Have you identified specific areas where there are seep samples or seep areas in the brook?

MR. PRINCE: Seep samplers. In other words, these are sample devices that we have installed into the brook. Into the -- now, if you go down to the Bound Brook near the site that's essentially the top of the bedrock, okay. So the rock is right

there. So that's a key piece of evidence that suggests that the groundwater and the discharge to the surface water is very likely.

We've actually installed these seep samplers right in the rock so we can measure the groundwater coming up into those samplers. We don't have -- what you're imagining is a landfill where there is stuff seeping out of it and we call those seeps and sometimes you would see little rivulets coming maybe through the side of a landfill or coming out of some fill area and we call that a seep. And that's not the same thing. It happens to be the same word. Very different.

MR. SPIEGEL: And how many chemicals of concern are in the groundwater at the site or in that shallow zone. How many various chemicals that are either carcinogenic or noncarcinogenic are there in the water that you're talking about in the

shallow zone at the site where you're

going to monitor?
MR. PRINCE: Are you talking about the wells because we don't have the data from the seep samplers yet.
MR. SPIEGEL: Well, you have a number of chemicals of concern.
MR. PRINCE: Uh-huh.
MR. SPIEGEL: And you know from sampling of those at the site.
MR. PRINCE: Yep.
MR. SPIEGEL: How many chemicals of concern are there in that groundwater zone that's potentially just discharging into the Bound Brook. How many chemicals are in those wells?
MR. PRINCE: Well, there are essentially two classes of chemicals. There's some metals, but there are two classes of chemicals that we find in those monitoring wells nearest the brook. They are VOC's, that is volitive organic compounds and it includes a number of different

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solvents and maybe, by the way, Rich, may be a little bit of PCB.
MR. SPIEGEL: That's cute, John. That's real cute.
MR. PRINCE: Okay. But in

particular TCE, okay, and then PCB's.
That's the second class of chemicals
that we found -- that we find in those
wells.
MR. SPIEGEL: But how many
different types of chemicals, is it
20, 25 something?
MR. PRINCE: Sure.
MR. SPIEGEL: About 25
different chemicals?
MR. PRINCE: Predominantly
those two though, TCE and PCB's.
MR. SPIEGEL: Well, really,
you know, to say that you are going to
monitor for 30 years is a disservice
to the community because you are
making assumptions based on one core
sample per 200 acres, approximately,
even though you did multiple layers in

that core sample.
So there is a lot of unknowns
here, but what you do know is these
are very toxic chemicals. A lot of
them are cancer causing. And you know
that you can do something at the
source that will have some impact.
You've taken 25 years, give or
take 20, 25 years to get to this point
and you come here and say you want

another 30.

EPA should go back and if it's a funding issue, then, you know, tell us the truth, tell it's funding. You don't have enough funding to do the type of work that you need to. But to say that you can't do anything when you could have an impact at least on a source areas and try to deal with them now, may be 25 years after the fact, but address them in some form and protect the children that are going to go down into the brook because everything knows kids play in brooks

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and they likely do here. This goes down into an area where there is fishing derbies in New Market Pond and so there is definitely people who go into this brook regardless of whether or not you put a sign or two up.

So there needs to be some work done and I think the EPA should really reconsider their position and go back and look at some maybe unique types of technologies, look at a potential of some type of fracking to get to the contaminants, look at some other types of innovative technologies that are

out there instead of your standard
models that may or may not work and
come back with something that will
help protect this community and not
wait 30 years just to find out that
perhaps you should have done something
before your grandkids inherit your job
and come back and tell us that they'll
monitor another 30 years. Thank you.
MR. PRINCE: Thank you. I do

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not have an answer to your question about hydrofracking in this sort of setting. I know that it is done. It has been tried. This was a phenomena that we were experimenting with back in the '90's to try and loosen up some of these aquifers and make them a little bit more interconnected and, therefore, allow a little bit more flow.

I think the answer is going to be that all you're doing is making the fractures larger, but you're not actually getting into the pore spaces. The pore spaces are still going to be isolated.

We can talk about that separately and certainly we are obliged to have a clear response to that as part of our -- as part of this process.

MS. SEPPI: Does anyone else have a comment or question. Please come up to the mike. Bill.

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MR. SCHULTZ: Bill Schultz, S-C-H-U-L-T-Z, Raritan River keeper.

Just real quick. The PCB's are basically non-mobile, correct. Does the TCE have any effect on the PCB's mobility?

MR. PRINCE: Probably.

MR. SCHULTZ: So the mixture of the TCE and PCB's could be a more mobile product than moving the PCB's around?

MR. PRINCE: Yes. And we think that the reason that we see PCB's in the few wells that we do at the levels that we do which is high is because those wells also have TCE in them.

So the corollary to that is when we move further away from the site and the TCE levels drop off the mobility of the PCB's also is tied to that. So as the concentrations get less of the VOC's that might be keeping PCB's in solution the PCB's

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are going to drop away, too, and that's what we see.

MR. SCHULTZ: Okay. So then does the increased mobility of the PCB's now, does that also carry through and does that have an influence on the ability to get into the food chain. In other words, can PCB's be picked up by plants and consumed by animals on-site and deer on-site?

MR. PRINCE: There area -- this is an excellent question and it's close to the area that Bob Spiegel was focusing on which is hey, are these constituents getting into the brook in that stretch and if we had a figure I could give you idea where -- we can do it here. It's almost all in this figure here, OU 2. That stretch is, you know, here's our hot spot. We have some wells along the railroad tracks and this is the Bound Brook running here.

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So that stretch where we have

got some seep samplers that we are testing up here and then that stretch which also happens to be the area where we find the highest levels of PCB's in the studies that we have done so far are right adjacent to the site in this area.

And we don't know exactly how far that might be and we don't know what those constituent levels might be and that's some of the testing we are doing right now.

And, yes, the results that we find from those studies we're going to apply to our quantitative risk assessment human health and ecological risk model processes which we have to do for all the PCB's in this stretch anyway.

MR. SCHULTZ: If this proposal was accepted does that lock you down into essentially doing nothing for the next 30 years but monitoring. Thirty

years is a long time. If there are significant changes in technology can you revisit your decisions?

MR. PRINCE: When we have sites and this is, unfortunately, not the only one, where we have concluded that there aren't groundwater remedies that we can implement that will actually clean up the aquifer, we do reevaluate that conclusion at the five-year review process.

So yes, we revisit that assessment and do an evaluation to see, hey, is there something new. Is there something that we didn't have in 2012, but we might have some years later that would allow us to move forward.

MR. SCHULTZ: One final thought. You're going to prohibit anybody from drilling any additional wells to this area. Is there going to be some sort of a deed restriction on properties?

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MR. PRINCE: The mechanism that would probably be used is a classification exception area. That's the way the State manages areas of groundwater contamination where they want to prevent use, and the exact details of that we would need to work out. But our goal would be to assure that no one can put in a well and the water is, officially the waters of the state are owned by the state and so you have to get -- you have to get a permit to install a well to use the waters of the State.

MR. SCHULTZ: Is there any way that someone who is prohibited from using water that's on or under their property, is there any way they can be compensated since Cornell-Dubilier is the direct reason they can't have a well on their property?

MR. PRINCE: I do not know the answer to that question. It's a very good question.

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MR. SCHULTZ: You know, if groundwater is impracticable because the wells would have to be to deep or you built your house on a rock or something.

MR. PRINCE: Sure.

MR. SCHULTZ: I understand. You can't use the groundwater. There is no groundwater to be accessible to you.

But obviously this is an area where people had wells, used wells, and now because of Cornell-Dubilier they can't use that water. So it sounds like there would be -- there should be some compensation.

MR. PRINCE: I don't know the exact details of State law. I will -- I can describe what has happened at some sites which is that if the State really doesn't want an aquifer used and they want everyone to hook up to drinking water for some health based reason they can request that a

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municipality actually issue an ordinance that requires everyone hooks up to public water.

And that would essentially enforce public water coming to the residents. Is it a perfect system, I don't know.

MR. SCHULTZ: Even if that -- even if that restriction is caused by one company, one single entity?

MR. PRINCE: Well, in terms of the -- what the State is after in that case I think is to protect the people.

MR. SCHULTZ: Well, I understand the State wants to protect the public health.

MR. PRINCE: Right.

MR. SCHULTZ: But what I'm saying is do property owners in this

area have the right to expect to have
well water and if one entity such as
Cornell is the reason it sounds like
they should be able to get some sort
of compensation.
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MR. PRINCE: Okay. That's an interesting question. I'm sorry I don't have a clearer response and we again as I mentioned, we are recording everything that we don't have a good answer to and our goal would be to be clear and transparent about any issues that are raised at this meeting.
Mr. Diegnan.
MR. DIEGNAN: Again, Patrick Diegnan, D-I-E-G-N-A-N. Could you -- maybe you mentioned it previously. Could you just clarify what exactly is the chronology here. You have got to make this recommendation.
MR. PRINCE: Sure.
MR. DIEGNAN: And there will be additional testing and when is the additional testing going to be completed. How will this affect this recommendation.
MR. PRINCE: Okay.
MR. DIEGNAN: What's the

timeline?

MR. PRINCE: Okay. Thank you. We are mixing two things together here and I'll do my best to tease them apart again.

We have two studies of the site that have been going on simultaneously and they have for the most part been independent of each other because, one, Operable Unit 3 is about the groundwater and another, Operable Unit 4, is about the Bound Brook and for the most part with one exception of this stretch of river that I pointed out those two things aren't really related to each other. They're not connected.

A VOICE: Could you speak louder, please?

MR. PRINCE: I'll do my best. I'll do my best to speak up. Thank you.

But for the most part those two pieces have been unrelated and so they have been on their own path and

the groundwater studies are

essentially finished. We know the extent. We know the problems that we face and we've tried any way to describe those tonight.

There is an exception to that completeness and it relates to that stretch of the river, okay. And in that stretch of the river really doesn't affect what we're saying about the rest of the groundwater, but it is directly related to other studies that we are doing in the creek particularly with regard to risk assessment, evaluation of users, evaluation of, you know, some child or adult who actually is in contact with those sediments or contacts the surface water.

Those studies are unique to that other piece, that Operable Unit 4. So we are proposing to move ahead and select a remedy for Operable Unit 3 right now, this summer, and I can

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give you a timeframe on our expectations there.

We didn't want to not come to this meeting, though, without noting that there is this piece, this stretch

of the creek where we are collecting
some more data, some uncertainty as to
what that data is going to tell us,
but then we're going to wrap that all
into that other study and then I hope
next year we're going to come with
some plans for what we would like to
do in cleaning up sections of the
Bound Brook that we know have PCB's in
them. We just don't know the full
extent of that and then we don't know
exactly whether this is -- this small
groundwater issue is contributing to
just this little piece.
MR. DIEGNAN: Well, since this
plan is lack of action why would you
put this plan in place before you
complete the subsequent study?
MR. PRINCE: Well, if we

concluded that we needed to take an
action for Operable Unit 4 that
related to the groundwater it would be
an action that would be over a very
small area related to somehow
controlling groundwater discharge into
the brook.
It doesn't really speak to
this larger problem that we're faced
with in this larger area. And so

while we could wait we have this information ready. It's not going to change in a year and the details are we think important to get out to the community and have this -- have this discussion now acknowledging that we do have some areas of uncertainty and some data that we still need to collect.

MS. SEPPI: You might want to mention about the record of decision.

MR. PRINCE: Yes. Thank you. I knew there was something I had promised to complete and I didn't

remember what it was.

So the process, this process involves us receiving comments from the community, from stakeholders, private parties or interested parties, municipality, other municipalities, interested parties in writing, at this meeting hearing from you and then evaluating -- and then looking at our --

MR. DIEGNAN: Again my comment would be you should not finalize this decision until the subsequent evaluation is complete since this

effectively is lack of action.
There's no benefit to the taxpayers, to the residents of South Plainfield to finalize this. Even if it's a remote circumstance one may affect the other. It simply doesn't make any sense.
Complete the second study. If it's going to be done next year come back at that particular point and
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consider the entire consequence of all Bound Brook and the site.
MR. PRINCE: Okay, thank you.
Just to finish the process, we'll close the comment period at some point. It's scheduled to close on the 20th of August. We'll then evaluate those comments. That's our duty before we make a finding, a decision. So we want to hear from you.
We will write a summary of our findings and a response to all those comments and then issue that in something called a record of decision.
Rich.
MR. CHAPIN: Rich Chapin.
I do have a memo with some written comments. If you haven't been given a copy I will be glad to get you

one.

Where else in New Jersey in the Passaic formation has the agency studied the matrix diffusion phenomenon at the level it did here?

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MR. PRINCE: In this formation, have we done these kind of studies?

You have to introduce yourself, Diana.

MS. CUTT: He knows me. Diana Cutt, EPA.

We have studied a handful of sites in the Newark basin.

A VOICE: Can't hear you.

MS. SEPPI: Diana, you have to use the mike.

MS. CUTT: We have studied a handful of sites in the Newark basin which is a similar type of rock that's at this site.

I don't know exactly the number of sites, but the White chemical site, there are a number of sites that we can give you a list of.

This site is pretty well characterized, very well characterized. In fact, it's sort of our model fractured rock site compared

to the other sites in the Newark basin. We have with it a bit of data.

MR. CHAPIN: How about technical impactibility. Where else has it been put in place and why in New Jersey?

MR. PRINCE: Exactly how many times have we invoked i in New Jersey, I do not know. I can name a couple of projects. Chemical Insecticide has a TI.

MR. CHAPIN: For what?

MR. PRINCE: For the groundwater, arsenic in the groundwater that we concluded we couldn't get out.

To name another site you're familiar with Horseshoe Road in Atlantic Resources site also has. We concluded that we couldn't actually pump any of the water in that clay, couldn't get the water out. There's no way to move it in any fashion and we selected a technical

impracticability as part of that

remedy which also included lots of source removals and treatments and other things, too, but that was the conclusion for that groundwater.

MR. CHAPIN: A couple of things, comments I have heard a couple times tonight about PCB's have not migrated off the site. The PCB's in the groundwater have not migrated off the site.

I draw your attention to Table 5-8 of the RI.

MR. PRINCE: Okay.

MR. CHAPIN: Specifically Well NW23 which is about a thousand feet off site to the east of Well 20 near Spring Lake. If you go down the list of (inaudible) that you have in that table for PCB's, you have got a lot of PCB in that well.

So I think you need to take a relook at that migration issue of PCB's off the site because as Bill

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brought up PCB's is very soluble, are very soluble and TCE. That's why Cornell used it to clean that equipment because it took it off so well and you get a (inaudible)

problem. So I think you need to take
another look at that.
MR. PRINCE: We will -- I'm
not going to try to get into specific
wells.
MR. CHAPIN: No. Table 5-8.
MR. PRINCE: Understood.
MR. CHAPIN: How much -- if
you go inside that boundary, that blue
line on that figure over there which
is your TI area, what is the total
mass of TCE in that area within the
rock and within the groundwater?
MR. PRINCE: We could
calculate -- we could make an
estimate. I don't know whether we
did.
MR. FREDERICK: We did not.
We made an estimate of essentially the

area in shallow groundwater, that
plume that's centered over the former
facility.
MR. CHAPIN: Okay.
MR. FREDERICK: In that area
we have estimated approximately
20,000 pounds.
MR. CHAPIN: In the water, the
rock or both?
MR. FREDERICK: Both, yes.

MR. CHAPIN: Okay. In the proposed plan and in other places you continually talk about the majority of the mass of the material being bound up in the rock.

If you haven't computed how much is there in total you can't make that statement. So I question where you're going with that. It sounds like a justification. We made a decision, we're going to find something to justify it.

So you need to have that very specific data there, compute the mass,

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show us how you computed the mass to allow us to look at it.

MR. FREDERICK: What I was going to say is we have. We haven't done the math for the polygon that we call the TI zone, but we've done the math at the specific wells that we have where we have concentrations in groundwater samples and we have specific core data.

MR. CHAPIN: What percentage of the total mass of the whole polygon for that 825 acres, are those little slices going down not significant?

MR. FREDERICK: Correct. But are you suggesting that the laws of physics change when we move away from them?
MR. CHAPIN: I'm suggesting that you need to do calculations to your support the statement that the minority of the mass is bound up in the rock. It may well be, but it may not be.
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If you look at the rock cores you did, by the way, you started out in wells in the center of the source area and moved in a straight line down to and hit Well 20. That's where you did your rock cores. Right down the center line which would have been the main transport channel being sucked towards all those wells at the north end of Spring Lake which is going to dominate the transport mechanism.
So you took those rock cores along the center line of the main line of contamination and in your model you projected out that we have concentration in the rock here, we have got to have concentration in the rock here.
You then came up with a

diffusion number for your model and
you run it and the diffusion rate you
chose from the concentration you
established arbitrarily at the
perimeter is what's governing your
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time zones -- your timeline. That's
what's going on in your model.
Did anybody go out after the
model projected that a hundred feet
east of that center line there would
be this concentration in the rock.
Did anybody go out and sample the rock
out there to verify that the model
projection was correct or accurate or
reasonable?
MR. FREDERICK: We went out
and sampled groundwater. We actually
installed MW23 after the modeling had
been done and the model not only
projects -- like I said we find very
similar concentrations in 20 and 16
and 14, very similar concentrations in
the fractured water as we found in the
pore spaces.
MR. CHAPIN: In the rock.
MR. FREDERICK: I'm giving
them. So if we see very similar
concentrations it tells us something

about the equilibrium between the

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fracture space and the pore space, right.

So we conducted the modeling. We went back out and installed model Well 23. We did not core sample rock, agreed, but we sampled the groundwater and found higher concentrations.

MR. CHAPIN: You missed an opportunity to collect an important data point to validate your model.

That's the major problem I had when I read through the modeling exercise in the back of the thing, I didn't see -- a classic modeling activity, you have a model and you calibrate it, meaning you pick the parameters that are going to control how the model works, what the answers are, but then you take a totally independent set of data and run it through and see how accurate they are, see how good your modeling is.

Modeling is more of an art than it is science and math from my

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experience.

MR. FREDERICK: You're talking about calibration.

MR. CHAPIN: Right.

MR. FREDERICK: Which is exactly what we did.

MR. CHAPIN: Did you verify your calibration with an independent set of data?

MR. FREDERICK: The data that we collected from the field, yes.

MS. CUTT: We had probably the best groundwater modeler in the country run this model.

MR. CHAPIN: I understand. I know who those guys are and, yeah, they are very, very good.

Part of the problem I'm having is that when you look at this basin, this Passaic basin, there is a fundamental approach to how it's looked at. It's called a leaky multi-unit aquifer and that doesn't seem to have been incorporated here.

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You don't seem to have taken what has been New Jersey geologic survey in 2010 and put it out as this is how you look at this thing.

On the back of my little

handout there is a concentration cross section that's attached to the plan and so taking a look at that, does it make sense here --

MS. CUTT: The more we study these sites in the Newark basin we come up with new conceptual models. We've done a lot.

MR. CHAPIN: One of the fundamentals of that thing, the model that I'm talking about, this is all sedimentary rock which means it was laid down at the bottom, it was laid down by water. The Newark basin because it got rock and rolled by lots of things, teutonic movements, it's tilted. So the bedding of the various layers of sediment are tilted and they are tilted to the northwest. That's

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well known. They are tilted at an angle that varies.

Well, if you plot the angle, that's what this line here represents, these are the possible angles that the thing based upon the data, it was tilted. This here represents the plume of the contaminants. It's pretty interesting that this plume is traveling right down this line here which represents potential bedding planes.

So it looked like bedding planes are significant in the transport sheet and it doesn't, like I said, in the modeling that you did you didn't seem to incorporate that.

You also arbitrarily split the aquifer into three layers and if you look at your contour elevations they're all the same. The elevation of the water in all three of the zones are the same. It tells you there is not three zones, there's one.

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MS. CUTT: And we did that for discussion purposes. Believe me Jeff and I went around and around on that.

MR. CHAPIN: I understand you may have done it for discussion purposes and you may have done it because that was convenient to use the fluid zones that you put in there.

MS. CUTT: That's not how we use the fluid zones.

MR. CHAPIN: I understand it. But it gives you the impression that you're looking at this as some sort of eco potential model and it's not.

MS. CUTT: You're absolutely right.
MR. CHAPIN: It gives the impression that you are looking at it from a point of view that the current the state we don't look at it. So I ask you to go back and relook and rethink about how this thing is behaving relative to this leaky aquifer.

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A VOICE: I have a question for you. In other words, that direction of that plume, is that plume direction consistent with the argument that the pumping station in Spring Lake Park was shut off?
MR. CHAPIN: Shut off.
A VOICE: About ten years ago.
MR. CHAPIN: If you look where the site is, where the plume is going up at the heading you have got the Spring Lake here. These wells were here. This plume is going like this. These are the Park Avenue wells that are being pumped today up in here.
Okay. This is where the plume is going, bending around the lake like that. Exactly where it's going.
One of the major problems with

this plan which is essentially to
monitor things for 30 years is that
the plume is still going to be here.
These wells up here will pump water
that comes out of this plume and it

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will do so for as long as this plume
exists.

You could look at that as
transferring the cost of cleanup of
this plume from the responsible party
to the consumers of this water because
this water has got to be treated so it
can be drank no matter how this stuff
got in the ground, but if this plume
is the one that is keeping the
treatment systems on line up here,
it's the consumers that are paying for
the cleanup.

MR. PRINCE: Okay. That
doesn't -- that isn't actually true
today, that the need for treatment is
because of constituents that are
discharging from the edge of that.

MR. CHAPIN: I understand TCE
and other organic solvents could be
termed ubiquitous in the groundwater.
Another of my comments. There is a
lot of allusion to alternate sites in

this area contributing to this

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groundwater plume.

MR. PRINCE: Yes.

MR. CHAPIN: I didn't find enough specific information to discount if it looks like a duck, quacks like a duck, it's a duck.

You have got a significant plume. This is significant. That has been pulled this way for as long as this plume exists because these pumping wells were in the ground pumping before this stuff gets spilled.

The day this stuff got spilled those wells started to pull it up and pull it up. So could there be other contributors. Yes. It's my conservative opinion that you would have to look here, if there is a major mass right here, right next to them wells.

Now, I haven't looked at vertical fractures which way they go. There is a lot of them in this

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formation that go up and down just

like that.

Last comment. I know that costs are not the only issue or the way you select it. I fully understand that. But when you look at the cost of 30 years of monitoring for this site, the option you're proposing at $5.7 million for a 30-year cost, which I remember the present cost, in the scheme of the Superfund Programs that's nothing. That is nothing. You were spending that in three months when you were actually doing the work.

The next cost is 17 million if I'm remembering my numbers. Whether it's true or not, on face it looks like we have a hard problem. We're going to pick the cheapest thing to get out from under it and be done.

I hope that's not the case, but that's the impression that I got from reading the documents and looking at them is that, well, let's get out.

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I hope it's not the case.

MS. SEPPI: Thank you, Rich. We're going to take a ten-minute break because poor Tina here as been going full speed for over two hours. So let's take a ten-minute break and come back at 9:25.

(A ten-minute recess was taken at this time.)

MS. SEPPI: Richard has one more question.

MR. CHAPIN: I have one more question that's key to this whole diffusion thing.

I have seen in the RI use of the term absorption by the rock matrix and adsorption by the rock matrix and you and you should understand where I'm going with this. Is the absorption or is it adsorption, what is the phenomenon?

MR. FREDERICK: Well, I would say all of those phenomena are at work. You can have this stuff

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adsorbing at the surface of the fracture. You can have it absorbing which is a --

MR. CHAPIN: I'm not worried about the fracture. The matrix of the rock diffusion, does it absorb into the liquid in the rock which makes it very free to come out in a true concentration gradient or does it adsorb to the surface of the rock which makes the argument about it coming back out very hard to swallow. It wouldn't happen.

MR. FREDERICK: If it absorbed to the surface --

MR. CHAPIN: Within the rock matrix if it absorbed the surface, how does it overcome that absorptive force to get back out?

MR. FREDERICK: It's very hard to do.

MR. CHAPIN: Right. So then that -- so then it would be locked up inside the rock matrix and not

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necessarily represent a continuing source that's going to go on forever like your model shows.

MR. FREDERICK: That's right, but not all of it absorbs to the rock.

MR. CHAPIN: How do you know the difference.

MR. FREDERICK: I'm sorry?

MR. CHAPIN: How do you know the difference. How do you know the difference from the testing you have done to calibrate your model?

MR. FREDERICK: How do I know the difference between the fraction

that may absorb within the core spaces
of the rock.
MR. CHAPIN: And be immobile,
truly immobile.
MR. FREDERICK: Forever.
MR. CHAPIN: Versus that which
is absorbed into the water and then
free to flow out as a concentration,
how does that work?
MR. FREDERICK: Well, we know,

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right, that it's either all absorbed
and, therefore, locked up in the rock
forever and is never coming out no
matter what we do.
MR. CHAPIN: Right.
MR. FREDERICK: Right. Or
it's all free to come back out, but it
still has to diffuse at a molecular
level through openings that is very,
very small.
MR. CHAPIN: You and I should
talk about this. Thank you.
MS. SEPPI: Yes. Come up to
the mike. Thank you.
MR. McCULLEM: My name is Paul
McCullem, M-C-C-U-L-L-E-M. I'm a
resident here in town, the Borough of
South Plainfield. I just have a few
questions and a comment at the end if

you don't mind.
When you were investigating the plume site you mentioned private wells, company owned wells. Were there also municipal wells in that
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test site.
MR. PRINCE: Yes.
MR. McCULLEM: Have they been shut down?
MR. PRINCE: No.
MR. McCULLEM: So our municipality is operating wells in the plume and did the EPA test them to make sure they are operational?
MR. PRINCE: Yes. There are several wells that are used in the municipality that weren't on the deed registry we worked with. The borough helped us to identify where those wells were. And one is used to fill the swimming pool, another is and several others are used to irrigate ball fields and we have tested all of those wells. There is TCE in those wells. We have analyzed a whole variety of potential exposures to that water from those uses and haven't identified, and Becky, our risk

assessor, can describe the process

that we've gone through on each of those wells. We haven't identified an exposure to either workers or people who might come into contact with where those wells are being used such that there was actually an exposure, and in particular I should mention the swimming pool, the levels in that particular well were at six parts per billion, okay. So the cleanup value for drinking water, the Federal number is five and the number for the state is one.

But this isn't drinking water. They get their water from -- they have drinking water provided to that facility from a local resource, one of the water companies for drinking.

So they only use it for this one purpose and we evaluated well, what's going to happen when you fill that pool and concluded that, in fact, the way it's filled and the levels which are so low in the starting water

would result in there not being

anything in the pool almost as soon as it's filled and we then tested the water before the pool opened and came to that -- found that same conclusion that, in fact, there wasn't anything in the pool.

MR. McCULLEM: Have your tests been completed on all of the municipal wells and are they in public record yet?

MR. PRINCE: I'm sorry, what was the last part?

MR. McCULLEM: Have your testing completed on all of the municipal wells and have you put suggestions into public record and your findings I guess.

MR. PRINCE: Yes. Yes.

MR. McCULLEM: Especially in the irrigation since they are soil contamination.

MR. PRINCE: Yes. We advised that any place where there is a well

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being used for essentially watering a lawn that, again let me just describe, TCE is very easy to remove and when it's being used for drinking water and what is done is that you cascade the

water in with air, right, you mix air
and water and the TCE is just going to
leave in the air like spraying it --
MR. McCULLEM: Misting it into
the air.
MR. PRINCE: Misting it. So
our advice to the borough was we are
happy to do any testing that they
might wish us to do, but we don't
expect to see any exposures.
MR. McCULLEM: Don't drink
from the sprinkler if you're thirsty.
MR. PRINCE: Well, there
happens to be -- thank you. Then you
had another comment.
MR. McCULLEM: No. I had a
few other questions. My other
question is in the 825 acre plume the
Army Corps of Engineer just recently

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completed their survey assessment. I
guess this is more of a hydraulic
question, so I'm glad there is
actually hydrologist here.
MR. PRINCE: He is a
hydrogeologist, but we'll try to
answer the question anyway.
MR. McCULLEM: Sorry. How
does flooding factor in say, for
instance, the recent flooding we had

from last year's hurricane, especially in the sense that we have in those areas homes' basements flooded out and I understand the heavy, you know, they go down, the further into the plume area they go we're talking about several hundred feet, but how does the ground table of course it becomes super saturated, the water can no longer permeate through into the water table so just the path of least resistance to go into basements and keep building up above ground.

So my question is there a

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possibility of it being picked up in these flooding occurrences. Was that looked at or is that something that I am just making up out of my head and this could never occur?

MR. PRINCE: There are sites, there are places in the country where the water table is shallow and if that water table were shallow and there were conditions where a surface water charging up, that water might literally raise the water table up until the ground surface where there could plausibly be some kind of an interaction between groundwater that might be contaminated and the surface water, the flood water which essentially is not. That is not the circumstance we would find.

MR. McCULLEM: Because of how deep it is?

MR. PRINCE: Because of how deep it is.

Now, we will be talking as

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part of the Bound Brook study about flooding. That's going to be one of the issues that we need to address because of sediment movement.

And what we have done, if you look at that map for Operable Unit 4, you'll see the areas that we have studied is much, much wider than the Bound Brook which isn't even as wide as this room, we need to look at the flood planes, too, because we need to understand that whole picture.

MR. McCULLEM: So in that whole picture when there is let's say a massive rainstorm is there the possibility of PCB contaminants being picked up in the sediment and placed wherever they may want to go or are you speaking out of turn to say that?

MR. PRINCE: We are going to be evaluating that and have a very complete answer to that question next year. Is that a plausible scenario, absolutely.

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MR. McCULLEM: Okay.

MR. PRINCE: Did it happen in the last flood. We will have some sense of that of when that happens what sorts of floods it does happen, you know, those sorts of answers we will have, be evaluating as part of that study.

MR. McCULLEM: In your evaluation you are recommending Alternate 2.

MR. PRINCE: Yes.

MR. McCULLEM: Which is just keeping an eye on the site, make sure the plume doesn't move into the northern area above Cedar Brook. In that does that mean there is no moratorium on current pumping or drilling or pumping stations that are there could be turned on at any time that are around Spring Lake Park to pull water out, if the water company feels inclined to do so and is willing to pay the cost of cleaning that

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water?

MR. PRINCE: Well, we have talked to the water company about what their plans are for Spring Lake and they have no current plans to turn it on again for a variety of reasons that are their own business decisions.

Were they to conclude that that was a good business decision of theirs to come turn it on we have -- we want to talk to them first before they do so, and really I do want to emphasize that our -- they've been very helpful in providing us with a lot of data about their -- how they have operated over the years because they have pumped at different rates in different places including Spring Lake. And we have needed to understand that -- those changes to understand the degree to which the plume might have gone in particular directions over time.

So we expect to have a long

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and fruitful relationship with that

company because of their interests in the area and if they have plans to make changes in how they would operate we're going to be partners in those decisions.

MR. McCULLEM: Besides the human impact, the carcinogens, what other environmental impacts, say, you know, the effects of trees pulling up TCE or for that matter the other wildlife. Is there an impact, you know, to the rest of the wildlife in the plume areas?

MR. PRINCE: The only areas that we are evaluating the groundwater as a potential ecological -- potential ecological end points. So that's trees or frogs or bugs or anything would be in that stretch of Bound Brook where it might be surfacing, actually is surfacing.

And we're going to do that evaluation. We have the quantitative

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risk assessment process for human health, a second separate ecological assessment process that we do for those things, trees and things that live in sediments and four-legged critters too, and in general the groundwater isn't available to those entities when it's 20 feet into the ground. Where the bedrock and the groundwater are meeting it may be, so we need to look at that.

MR. McCULLEM: Now, for my comment I don't think Alternate 2 goes far enough. That's just my general opinion. I think that's the Band-aid.

I think a fair assessment is you have to wait until you're done seeing how much it affects the outlier areas, especially concerning the Bound Brook before you decide what to do. Whether it means Alternate 4 for the site itself, which means if that were something and the science is there to do it that also means to the township

sits longer unavailable for further cleanup which under the circumstances I think it's needed.

I think Alternate 2 is the Band-aid and it's not fair. This sits over the heart of our town essentially. It's kind of a deplorable thing to think having been raised in this town that that's what we're stuck with and that the Federal

Government agency is telling us, you know, well, there's nothing we can do. There's no one we can go after, sorry. We're going to monitor it and that's the best we can tell you.

You know, if money were no object I guess this could be cleaned up, but since it is, you know, at this current rate you probably won't be able to do anything in the foreseeable future.

Mu comment though is if the funds are there and science is there I would like to see a better mediation

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of the site. Plus I would like to see a moratorium for absolutely no drilling or pumping be in the plume site at all, have a set date. It doesn't matter how clean they may think they can make the water that's just again another Band-aid saying certain parts per billion are okay for your body to take in, who cares if there are radicals in your system.

I think that's unacceptable, too, not just those that live in South Plainfield, but to the outlying areas of residents who also have to drink this water.

That's just my comment. Thank you.

MR. PRINCE: Okay. Thank you.

MR. ANESH: Matthew Anesh, A-N-E-S-H. I am a life long resident of the Borough. I just happen to be the Mayor of the Borough as well.

Regarding Alternate 4, I think it was you said it hadn't been done or

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tried on a site as large as this and I believe this was a $20 million figure.

MR. PRINCE: There is a bigger one that over a hundred million.

MR. ANESH: Do we have a time and cost estimate that was even to be thought of as feasible as to what that cost would be and how long that would take for Alternative 4?

MR. PRINCE: Yes. Alternative 4, we looked at two different scales, okay, and there is -- well, let's try this one. For the facility again a postage stamp on a big envelope of the area that's contaminated, but this is the part of the site where the discharges took place and it's the part of the site where the highest levels of contamination are found.

And then in an area of a couple of acres in the back of that -- of where the building was, the paved area now, but a couple of acres where it's again even higher, thousands and

thousands of parts per billion TCE and some other constituents.

So this smaller scale highest concentration area, that was an estimate of about $20 million to do that work and run all the monitoring that we were talking about.

We then looked at a larger area for both Alternative 3 and Alternative 4 that is about 12 or 15 acres and for the Alternatives 4B I think it was in the neighborhood of about 120 million and the timeframe is 18 months from the start of construction to the end for the shorter one.

MR. GARCIA: No. It's three years, one year for the short.

MR. ANESH: Then regarding Alternative 3, what is the timeline and cost if you were to do that. Again like you said, that you could do it and three months, four months later it would be back.

MR. PRINCE: Right.
MR. ANESH: At what point, at what cost would you see any improvement at all to the environment, to the site or do you ever get there?
MR. PRINCE: Well, the modeling that we did took us out to I think 200 years.
MR. ANESH: 200 years of that same process.
MR. PRINCE: Working at that process and there was no evidence that it was actually showing any change in the larger aquifer.
MR. ANESH: So with Alternative 2 which is what you're recommending.
MR. PRINCE: Right.
MR. ANESH: You said potentially five years if technology changed --
MR. PRINCE: Sure.
MR. ANESH: And let's say there's an alternative, if that comes

out.

MR. PRINCE: Right.
MR. ANESH: Is that capped off at five years or could that be 20 years down the line, 29 years down the line, 30 years down the line.
And just as a second part to that.
MR. PRINCE: Okay.
MR. ANESH: Is that your decision or can the Borough, can the residents petition you or is it specifically the EPA that decides that there is new technology that may be beneficial.
MR. PRINCE: Excellent question.
MR. ANESH: Who controls that reopening of the process if you close this out?
MR. PRINCE: For all sites, this is just generic comments, not about Cornell, but for all sites where material is left behind and we have to

manage something on site EPA in the Superfund Program is required to come back every five years.
MR. ANESH: Okay.
MR. PRINCE: So it's not five

years and then we looked and that's
it. It's five years, five years.
MR. ANESH: So even after the
30-year monitoring.
MR. PRINCE: Yes. The 30-year
monitoring is a benchmark that we
typically use as a way of comparing
one site to another. There's no
boundary. Nothing changes after 30
years. If the conditions are still
the same, the law is still the same
the Superfund I mean, the EPA's
obligation to continue that monitoring
wouldn't change.
MR. ANESH: And last, but
certainly not least, we have been
living with this since the '60's.
Obviously it's not going to change our
daily habits. Those of us, who are --

well, the majority of the residents
getting water from the water companies
we are going to continue our daily
lives. There is really not
necessarily a cause for concern or is
that just too lackadaisical of a
statement. That's a tough one.
MR. PRINCE: That's a tough
question.
MR. ANESH: Obviously you

given the points that we should be aware about. If you're using well water, that might not be the best course of action especially over a certain period of time.

MR. PRINCE: Yes. We don't think that's a good --

MR. ANESH: If you are watering your lawn company, maybe that's not the best alternative, but if you are using water, company water, you're going about your daily life what are the risks, if any, to your average resident in town?

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MR. PRINCE: Well, we think that the potential exposures can be managed and that's our responsibility to --

MR. ANESH: The vapors.

MR. PRINCE: -- create mechanisms whereby they can be managed. And that doesn't mean that we don't want and, in fact, need a working relationship with the Borough and with residents to keep us on our toes and to assure that we are getting our message out to maybe the person who didn't come to the meeting.

MR. ANESH: Correct.

MR. PRINCE: And that we can, you know, that dialogue is very important especially for sites like this where, you know, if anyone is coming away from this meeting assuming that there actually is some solution for the whole of this issue that we just haven't looked at, I'm sorry, but it's just not out there. Are there

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some parts we can deal with, maybe.

Are we going to have to live with this to some degree over the long-term, yes, we're all going to have to live with.

MR. ANESH: There is obviously been potential obligations about, you know, budgets and that hasn't really come into your analysis here. Obviously you weighed the impact, but not only the cost of it, but the benefit of the essential cleanup of the site, and that's your rationale for your recommendation for Alternative 2?

MR. PRINCE: Well, we spent $80 million on Operable Unit 2 on the facility. Bound Brook is probably going to cost a lot more than that.

So the risks are there and the results of those expenditures I think are going to be much more clearly understood and much closer to residents, to people who might use the
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brook.

I think then the groundwater which tends to be a little bit the poor stepchild of the media that we need to deal with because people don't necessarily come into contact with it.

So we certainly have not been shy about spending the money that we needed to do to do cleanup here and we expect that we will have a lot more to deal with.

MR. ANESH: This money is not coming from the original property owners?

MR. PRINCE: We have had some small settlements of some of the parties that are associated with the liability for the cleanup.

Most of the funds are coming from state and Federal coffers.

MR. ANESH: Thank you.

MR. PRINCE: Thank you.

MS. SEPPI: I think he had a

question. Come up. We'll get to

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everybody.

MR. RICHILLI: Good evening. Tod Richilli. I'm a South Plainfield resident. I actually live on Audubon Avenue which is about a mile and a half north, northeast of the Cornell site, basically due east of the Park Avenue well fields as they are shown on your map there.

My wife, my five year old and I actually drink water exclusively from Brackwood well on our property.

MR. PRINCE: Okay.

MR. RICHILLI: And over the course of the ten years that we have been in the house we've actually had the well water tested and it does show the presence of some of the very same compounds that you guys have described present in the Cornell site as well the TCE/DCE are all present in that well water.

Obviously, I have taken some great concern and some great interest

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in the project that you've been

working on and spent quite a bit of time in the library over the course of past few weeks reviewing the reports and the administrative record that you do have on file.

I'm generally supportive with the spirit of the preferred alternative, Alternative No. 2. I do have some concerns. I'm not very compelled by some of the data in the report, some of the findings in the report that have helped define the area, the extent of contamination. In consideration of others I'll submit some comments in writing regarding that.

MR. PRINCE: Thank you.

MR. RICHILLI: But I did want to state again as a comment I am generally supportive of the preferred alternative.

I guess I just wanted to maybe conclude by saying I would appreciate

the opportunity to speak with you further about the well test data that I have for my private well to see if there's any reason for concern or if it raises any additional data that might help support the investigation.

MR. PRINCE: Excellent. Thank you very much, Tom. I appreciate that.

MS. SEPPI: Dana, you had a question?

MS. PATTERSON: I have a question and comment. Hi, I'm Dana Patterson Program Supervisor for Edison Wetlands. That's P-A-T-T-E-R-S-O-N.

I support Assemblyman Diegnan's points and the residents' point at this time. I don't think it's right to make a decision for OU 3 without finishing up the Bound Brook being you guys are pretty close to EPA's timeline to coming up with what the data is showing and coming up with

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a cleanup plan. So I think that this should wait until that data is given to the public.

My second question or concern is regarding the vapor intrusion.

MR. PRINCE: Okay.

MS. PATTERSON: So you said in your presentation that you have tested 25 homes within that area or a little bit south of that area.

Is there a reason why every single home in that area was not tested for vapor intrusion with a Summa canister?

MR. PRINCE: You mean a Summa canister inside the house?

MS. PATTERSON: Yes.

MR. PRINCE: We have done a survey to try and evaluate whether vapor intrusion is an issue.

MS. PATTERSON: Uh-huh.

MR. PRINCE: And generally Summa canisters are not the best way to evaluate whether there's a general

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concern because they are only testing what's inside the house.

MS. PATTERSON: So a Summa canister and a --

MR. PRINCE: Well, we certainly expect to do more testing and I don't want to -- again I want to reemphasize, we don't want anyone to assume we are finished with this process.

But we didn't really find a reason to be concerned based on the sampling that we have done to date and we are planning to do more.

MS. PATTERSON: How many homes are within that area, 150?

MR. PRINCE: I don't even think it's that many. A hundred.

MS. PATTERSON: That's only 25 percent of the homes you have tested, actually less because you have tested some homes outside of that area.

MR. PRINCE: Okay.

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MS. PATTERSON: Right. Okay. I think before you can come up with a cleanup plan and remedy that you have got to know to the fullest extent if there is a vapor infusion problem and the only way you can do that is to test all the homes. As we've seen up in Pompton Lakes some homes in the plume didn't have any readings, some homes right next to them do.

So I don't think it's conclusive that you tell each home individually does not have vapor intrusion without testing every single home within that area. So that's one comment.

MR. PRINCE: Okay. Thank you.

MS. OFRANE: John, can I just add I'm Becky Ofrane, from Risk

Assessment.

We do also have a health consultation at New Jersey Department of Health and ATSDR the Agency for Toxic Substances & Disease Registry

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compiled based on our data and data that the State collected also concluding that as of now we don't see a vapor intrusion issue.

We can provide copies of that report, but as John mentioned we do plan to continue monitoring for vapor intrusion.

MS. PATTERSON: Once again that data is probably based on 25 percent or less of samples that were taken. I would assume. So in my opinion that study is not complete or incomplete.

My third point is regarding the groundwater plume contamination. Has this -- have you guys compared contamination here with the contamination in groundwater plume and groundwater investigation and pilot studies that have been done in Raritan Center, in Edison as part of Raritan Arsenal cleanup. Has that been evaluated or looked at?

MS. CUTT: Is that a Superfund site?

MS. PATTERSON: It is a contaminated site that's being cleaned up by the United States Corps of Engineers and part of the site is actually under EPA Region II building, the groundwater plume which is why EPA has vapor mitigation systems on some of their building. So has that area groundwater plume and pilot studies that have been conducted on that site to figure out how to clean up the groundwater plume areas of concern, has that been compared or have you looked at that as a possibility for this site as cleanup option?

MR. PRINCE: We haven't. I mean there are many, many sites out there and --

MS. PATTERSON: The reason that I ask that is it's in close vicinity and they've been successful in groundwater bioremediation and I'm

not sure if the bedrock is the same.

It's pretty close in vicinity. So I think that would be something to look into prior to proposing a solution.

MR. PRINCE: Okay. I take your comment. There is some information in EPA about that project even though it's not in the Superfund Program. We can certainly speak with the Army Corps about the details of that.

MS. PATTERSON: The case manager is Sandra D'Pietro of the Army Corps of Engineers.

MR. PRINCE: Okay.

MS. PATTERSON: She is very knowledgable and they have trailer right at EPA Edison's office.

MR. PRINCE: Sure. I'm familiar with it.

MS. PATTERSON: And the fourth thing I would like to bring up is I have a statement from Jeff Tittel who is the Director of the New Jersey

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Sierra club. That's T-I-T-T-E-L, that I would like to read into the record on behalf of him.

Tonight the Environmental Protection Agency is having a hearing on their proposed plan to monitor the groundwater at the Cornell-Dubilier Electronics Superfund site in South Plainfield.

This proposal is not acceptable for a site that is contaminated with polychlorinated biphenyls and volatile organic compounds, which are likely carcinogens and are dangerous to human health.

The EPA instead of proposing a plan to monitor the site they should be proposing a full and thorough cleanup. This area that is contaminated provides the water supply for Middlesex County and monitoring this water is not enough to protect these residents' drinking water.

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It is especially disturbing that the monitoring of the water contamination is considered the third phase of this cleanup plan.

In the groundwater there are more than 26 different chemicals that are a risk to public health and drinking water supplies. Individually these chemicals are hazardous and as they mix in the groundwater they create a witch's brew that makes them even more hazardous.

This site is in the Newark Basin which is a sandstone formation making the cleanup of the groundwater not that complex from a geologic perspective. Arsenic would be released into the groundwater, which is natural occurring in the sandstone rock putting health and safety at risk.

Using that as an excuse not to fully clean up the site is wrong because by not cleaning up the toxins

they end up spreading to the people's basements and homes through vapor intrusion.

Just because you have a cleanup plan does not mean it is clean. Monitoring is not a cleanup and should not be used as an excuse to clean up the site. This site will end up sitting there for decades pushing more contamination and toxic chemicals into the environment, water supply, and community around them.

This also reinstates the need for the passage of the Superfund Tax introduced by Congressman Pallone to make sure we have the funds to fully clean up these contaminated sites. Toxins such as PCB's and VOC's volatile organic chemicals are extremely harmful to the public, the public health and extensive cleanup needs to be done to ensure that as much toxic material is cleaned up as possible.

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This is on the Superfund list because it needs to be a priority cleanup and not allowed to sit there putting toxic chemicals in the community for the next 20 years. When you have a site that is this dirty and this complex it does not need monitoring. It needs a complete cleanup.

We cannot allow these toxins to stay in the groundwater because they will get out impacting to our drinking water, streams and even worse vapors from the contamination will end up in homes affecting people's health.

They are holding up this cleanup because of cost. It shouldn't be about cost. It should be about cleanup. Thank you.

MR. PRINCE: Thank you.

MR. WHITE: Derrick White, South Plainfield resident, also serve on the Borough as counsel.

I just have one question. I

know you mentioned several times that you are going to continue testing and this solution is deemed as monitoring.

I was wondering if you could give us more specifics as to what that looks like and how you determine what tests you are going to give to move forward with.

MR. PRINCE: There are a couple of things, a couple sort of phases of that. Part of that is simply understanding the scope of the groundwater contamination as time goes by.

So our expectation is that this plume has achieved a certain size because of its age and the characteristics of the rock and that we don't think it's getting any larger, but we need to monitor and demonstrate that that's, in fact, the case.

So there are a number of

monitoring points that we have in the

aquifer now and we are going to need to enhance that a little bit before as part of any monitoring program just to assure that it's entirely comprehensive.

The investigation report I think identifies a couple locations where we would install, like two or three locations where we would install some other --

MR. FREDERICK: Long-term monitoring.

MR. PRINCE: Wells for long-term monitoring.

We also consider part of that monitoring program our relationship with Middlesex Water Company because they are down there near the toe of our plume and if either their operations change such that their pumping is different at different wells or at different locales that may affect how the plume moves over long periods of time, but over time and we

want to know what sort of levels they

might be getting into their system.
It may be a factor of monitoring the brook, but again that's part of a larger study and we're years away from implementing a remedy in the brook because we haven't even selected it. We are still doing those studies. That's down the road. And the other part of it is doing additional vapor intrusion testing.
What am I missing. Am I missing any components of monitoring?
MR. GARCIA: Private wells.
MR. FREDERICK: Private wells.
MR. PRINCE: Search for wells which I think we consider kind of an ongoing process.
A VOICE:
MR. WHITE: So if I understand correctly you're going to be monitoring for the expansion of the actual (inaudible) portion.
How frequently will the list

of monitoring that you just laid out, how frequently will that occur?
MR. PRINCE: There will be a rather intensive phase based on our experience at other sites where we are

doing long-term monitoring.
We tend to do a rather intensive phrase at the beginning and that's several times a year for several years. So let's say quarterly. And at the beginning we really need -- we'll be refining and figuring out exactly which ports on which wells because, remember, we get these wells, we can sample at maybe nine or ten different levels. Some of those are clean and some of those are contaminated. Figuring out how to do that is a process that happens at relatively more greater frequency at the beginning and then as time goes by we will pull back on that a bit because we expect that what we will see from that data is the same data,

close to the same data with each passing sampling. So once we start to see that, then the timeframes between sampling are going to extend out.
Now, what is it going to look at -- is it going to be annual in ten years, annual sampling in ten years, I don't know. Is it going to be less than, say, once every five years, certainly not. But, you know, how

long is it going to take till we get to that point I don't know. We might be doing more intensive sampling for ten or 15 years.

MR. WHITE: Two more questions.

MR. PRINCE: Yes.

MR. WHITE: The first being how will that be reported back to the residents of the Borough and then the last question is tonight obviously there have been comments that disagree with the recommendation.

MR. PRINCE: Sure.

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MR. WHITE: I know you've laid out a dollar amount of $80 million and obviously there are a lot of data reports here. I guess my question would be how does that $80 million and those data points weigh against residents' comments and concerns?

MR. PRINCE: I use the figure 80 million and I think you misplaced it.

MR. WHITE: Okay.

MR. PRINCE: So I'll see if I can correct it.

MR. WHITE: Sure.

MR. PRINCE: I'm sorry, what was your first question?
MR. WHITE: The first question was about reporting back on the monitoring and testing.
MR. PRINCE: Oh, yes. What we have done at some projects and this one might be, might warrant from this kind of interaction is that we have established a kind of a portal where

interested parties can get in and look at data that's produced.
MR. WHITE: Okay.
MR. PRINCE: We haven't been doing that at this site, but that is because getting onto internet sites and being able to post data, we are all getting better at it. That is becoming more and more common and so that is one option.
We have certain requirements that Congress puts on EPA as far as putting material in repositories which is next door at the library, in publishing material on our website.
This would be another sort of local thing that we could certainly consider.
Now, I used -- I put a dollar

figure when the Mayor was speaking and that was the cost, the approximate sum cost of our cleanup of the facility.
MR. WHITE: Okay.
MR. PRINCE: Only that, okay.

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The proposed plan discusses a number of costs for comparison purposes of a number of alternatives and, you know, Alternative 4B was something like $120 some million and Alternative 2 is just the monitoring is something less than $6 million.
Having said that, do you want to ask your question again?
MR. WHITE: Sure. Obviously you're talking dollars and cents. You talking about a lot of data points that you shared here and the residents are talking concerns about things that mean something to them in their comments and asking you to forego your recommendations and look at another option.
I'm just wondering in the balance of things, the financial piece, how much is the weight of the public's comments considered up against those data points and that

financial piece that has been done

over so many years, over such a long length of time?

MR. PRINCE: Okay. There is a process that is in the statute for how we evaluate alternatives and that process includes nine criteria that we use to evaluate and compare alternatives. One of those nine criteria is community input. Another one of those criteria is cost.

So both of them are factors, both of them are important factors to us. The proposed plan, EPA website gets into a lot of. If you get into -- I can sort of lead you there if you want to do some reading.

It talks about that nine criteria evaluation process. The proposed plan itself, has sort of a synopsis of what those comparison criteria are and as I say both of those are important to us. One doesn't outweigh the other.

MS. SEPPI: John, let me give

this to Mr. White, too.

MR. PRINCE: Yes.

MS. SEPPI: Because it's in our proposed plan. It has the nine criteria and then it goes through and explains each one in detail. So at least you'll have that to refer to.

MR. WHITE: Thank you.

MR. PRINCE: So, yes, we weigh a variety of issues including those two things in evaluating remedies.

MR. WHITE: Thank you.

MS. SEPPI: Bob.

MR. SPIEGEL: Bob Spiegel. I just had -- this gentleman wanted to get up and speak, but I think there's an important point that the Mayor and everybody here should consider when we look at what we are being asked to allow EPA to do.

And that is really that while I would like to think that the United States of America Environmental Protection Agency will always be

around, always watching our back, always monitoring, there's no guarantee.

As a matter of fact, the U.S. EPA, correct me if I'm wrong, but they

are an instrument of Congress, are
they not, and every year the Congress
has to appropriate the money and renew
the authority for the U.S. EPA; is
that correct?
MR. PRINCE: Essentially.
MR. SPIEGEL: Right. So every
year, and we hear from Washington, you
know, there are those that beacon
louder and louder for the U.S.A. EPA
to be dismantled, to have their
authority taken away and not exist
because they are blamed for killing
jobs.
I don't believe that, but
there are some that do and those
voices in Washington are getting
louder and they are getting more
fierce and they are getting traction.

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So now the U.S. EPA has the
authority to do the cleanup. They
have the ability to order a cleanup.
They have the ability to get the
funding to get a cleanup, but there is
no guarantee that that authority will
be there a year from now or five years
from now because it really depends on
what's going on with Congress, who
gets in office, because we saw what

was done at the N.J. DEP and I would have never thought five years ago there would be -- all the cleanups would be done by the polluters themselves with almost no oversight, but here we are today and we have no oversight from the DEP for site remediation, almost zero. The polluters self-regulate and they self-report and there's very little, if any, monitoring.

So now the EPA has that authority. They have funding and they have a mandate to do cleanup and they

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should be held to that mandate. Accepting that they will be here 30 years from now to watch our backs, to protect our water is assuming a lot because we know we aren't good at long-term. I know most people aren't and to say that they are going to be here 30 years from now checking that water, making sure nobody is drinking it, making sure nobody is playing in it and making sure that it didn't spread, that's a lot to ask for and it's a lot to be asked to swallow.

I have seen over the last two

years the decisions that have come down at sites across the state from the EPA and they have been going more towards monitoring, capping, containment in place at sites around the state.

All you need to do is do a Google search and see, look at the decisions that have been made at sites that are bad that EPA has that are

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like these old sites and they are just trying to get them off their balance sheets and said well, we made a decision, that decision is to monitor long-term and time and time again you would have never thought that that was the case because was a bust.

Even when they did the site and the soils on the site that was great and that did cost a significant amount of money. That money was there because of what, John, how did the money come to be for the soil cleanup for the site. It was a pot of money set aside for job creation; right?

MR. PRINCE: Well, a portion of the cleanup money did come from the stimulus funding that was issued by Congress in 2008.

MR. SPIEGEL: Right. And that was great. This helped to get the soil cleanup done because it probably would not have happened.
MR. PRINCE: It would not have

happened as quickly as it did.
MR. SPIEGEL: Absolutely. And what is the guarantee that EPA will have this mandate a year or five years from now and that what we've seen happen at the State will not happen to EPA as far as losing their funding, losing their authority.
What is to say that Congress doesn't change those criteria that you now have to abide by in terms of selecting remedy and monitoring. What is that -- what protection is there for the public that that will be in place a year, five years, 30 years down the road?
MR. PRINCE: Are you asking me that question?
MR. SPIEGEL: Yes. Besides you're saying that it's in the rules.
MR. PRINCE: You're actually expecting --
MR. SPIEGEL: No. Besides

saying it's on the paper, what is that

paper worth. What is that paper worth. What is it that provides that assurance that paper doesn't -- can't be changed, too?

MR. PRINCE: Well --

MR. SPIEGEL: Does it bind them?

MR. PRINCE: I was not trying to be lighthearted. I just was surprised that you actually expected me to try and predict the future in that way. People have been --

MR. SPIEGEL: Well, you are making a promise. What is your promise worth.

MR. PRINCE: Let me just observe that there has been a hue and cry to change the Superfund program and make it less robust since the day it was signed in 1980.

MR. SPIEGEL: So have those voices ever been as loud as they are today?

MR. PRINCE: I don't know,

maybe they haven't. The results have

been that the changes have been small, moderate with the exception of, you know, what you and I have talked many times about and that is the change in the tax process.

And that certainly has been something that has meant that we, EPA need to work in a different, a slightly different way in dealing with how sites get -- when the funds become available because Congress now authorizes when funds become available for us to do cleanups. So that's certainly --

MR. SPIEGEL: But what holds you to that promise of 30 years that you will still be here to watch the water. Is there an answer?

MR. PRINCE: I can't answer that beyond saying our expectation is that the Superfund Program has a long and robust future ahead of it. That's my expectation.

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MR. SPIEGEL: But you're at the whim of Congress.

MR. PRINCE: And that what we are presenting here are the facts about the site and those are what they are. And, you know, you made an observation about how we need to be doing a big cleanup here taking this -- doing something different and we're certainly here to listen, but if you took away from this presentation that the big plume is somehow available for us to clean up then maybe we didn't do a very good job at our presentation.

MR. SPIEGEL: No, actually my question was what is the guarantee that your promise of being around for 30 years to monitor that big plume, what is that guarantee really worth to the people that you're making it to and that's really what it comes down to. I understand your intentions are good as are Pat's and everybody else,

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but what is that -- what is that good intention worth. That's the question.

MR. PRINCE: Okay. Thank you.

MS. SEPPI: Yes, sir.

MR. MORRELL: Hi. My name is Larry Morrell. Alice Temple is in the audience and she sent me a long e-mail this morning that really gets down to a very practical issue and that is the waterlogging of our subdivisions and basement flooding and when the water company Spring Lake pumps shut off Jeff shared with me the information that the water table changed five feet.

MR. PRINCE: Yes.

MR. MORRELL: And I just can't believe how many homes in South Plainfield have had severe flooding and soil waterlogging which ends up killing the soil, compacting the soil so it's never returnable to a proper absorption function.

I mean we are talking about

really serious issues and somehow the fact that the water table went up so much in a short period of time was not shared with the community, people weren't given preparation, and I know dozens of homeowners that had severe repercussions in the last 10 years, severe repercussions and I think it's just, you know, there is other consequences when the water company shut down and wasn't pumping all of the water from the Spring Lake area.

MR. PRINCE: Okay.

MR. MORRELL: Water table goes

up, I mean the Borough should have
communicated effectively to the
citizens that things are going to
change for their basement flooding
situation and that's my point.
MR. PRINCE: Okay. I just --
I'm happy to get some more details on
where some of those houses are and
maybe as part of our response to your
question in our written comments we

will try and be helpful in explaining
how the groundwater changes, if we can
figure it out, might have influenced
some of those --
MR. MORRELL: Fair enough.
MR. PRINCE: And you should
accept the possibility that there may
be other factors associated with it.
That it's not maybe exclusively that
or maybe not that at all depending on
where the houses are.
MR. MORRELL: That's true and
I agree with you entirely. I'll send
the details to Diego.
MR. PRINCE: Thank you, very
much. I appreciate that.
MS. SEPPI: Are there any
other questions or comments. One
more.

MS. KLIMIK: Hi. My name is
Mary Klimic, K-L-I-M-I-C. I'm from
the Avenell section of Woodbridge
Township so I wanted to wait and let
everybody from South Plainfield go

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first. I want to thank the
representatives of the EPA for having
this meeting and Edison Wetlands, Bob
and Dana. I want to thank Dana for
sending me the notice to come here
tonight. I have to come here -- last
year I went to another municipality
for a meeting with EPA officials. I'm
trying to educate myself about these
issues.

In Woodbridge we don't have
these meetings. I'm concerned about
the site in my town on Avenell Street,
General Dynamics that has some EPA
numbers and DEP numbers. It's
probably not on a Superfund site, but
it should be.

And the talk about TCE really
concerns me and I asked this, Ms.
Cutt, she is going to send me about
this Passaic formation because I don't
know anything about geology.

MR. PRINCE: Yes. I was part

of that conversation, too.

MS. KLIMIK: Right. It's all new to me. To find out if that is the kind of rock formation we have there because our site, a hundred years ago we should be having a little celebration, that they built this factory in Avenell, Security Steel, and for all those years it was a good thing. It was a good plant and at one point there were jobs for over a thousand people there.

But in 1965 it was bought by General Dynamics and at some point in the early '70's they decided to build underground storage tanks for all of these organic solvents that they were using and the main one is TCE and the smallest of these tanks was 5,000 gallons.

MR. PRINCE: Okay.

MS. KLIMIK: And some of the references, when the tanks started leaking was in the early '80's and some of the references that were

printed say one leaking underground

storage tank. But anyway I have been able to determine pretty much accurately that it was actually 11 tanks are on that site.

So if this Passaic formation is the rock we have there and we did have such extensive amount of TCE there, then the same situation applies there and that groundwater, we do have the pump -- well, we did have the pump and treat.

When we had a meeting in 2007 it was announced that that's how it's being treated.

MR. PRINCE: Okay.

MS. KLIMIK: But at this point this year I don't believe it's even being treated that way because, you know, when it's hot, and it's been so hot this summer, usually when it's hot you could smell it at certain locations. You don't smell anything.

Also a woman, who I guess they

have a contract with General Dynamics to sample. She comes to take samples. She told me they can't possibly be treating anything over there because they turned the electricity off. So this is just worse and worse and worse.

But I'm educating myself so I can go back to our governing body and give them a little information about this Passaic formation because we have -- the reason this is important that someone from our town starts communicating with the EPA what's going on there, we have the Mayor of our town making announcements that this will be -- this General Dynamics will be knocked down and the solution is to build 500 townhouses on that site. And even some of the literature they put out says within a matter of months they are going to announce the developer. I'm saying how could you announce a developer when they never

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even started the cleanup. We are eliminating. It's like an unreal world over there.

So to say this here is such a different atmosphere than the meetings that were held in Avenell school when we first had the meeting in telling people in the neighborhood we had 24-hour notice to go to a meeting at the school, a meeting about General

Dynamics. Nobody knew what it was about and it was basically the Mayor and certain officials deciding, well, we're going to make this for 500 townhouses and we don't have to clean it up anymore.

I feel like I'm coming from a world of total unreality, you know, but that's actually what's going on over there. Now, the last thing the reputation just to verify this of what kind of unreality we are dealing with. Woodbridge is the town. Maybe this doesn't concern the EPA. But just in

the past few months they had the announcement Woodbridge welcomes with open arms the toxic dirt pile from Bound Brook.

They put it that's a different site, El Paso on the Raritan River where previously they had announced they're going to build access to the Raritan River for the first time in a hundred years and we're going to have a park, a recreational facility. Now we have that toxic dirt pile over there.

So I intend to go back to the

next town council meeting or whenever
try to at least bring up the Passaic
formation and some stuff that I have
learned tonight. So thank you very
much.

MR. PRINCE: Thank you.

MS. SEPPI: Thank you.

Are there any other questions
or comments?

MR. BARILO: Hi. My name is
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Stanley Barile, B-A-R-I-L-E. I'm a
resident in town for 58 years now.

I believe the water company
well drilling and apparently if you
take water from the aquifer it could
be a catalytic factor in this whole
problem because if you're taking a
great amount of water out something
has to fill the void. As it's been
said that the teutonic plane migrates
on the northern angle. That could be
a contributing factor.

Also a resident stated that
their well water close to the vicinity
has been found with PCB's or TCE's or
whatever. So I believe maybe some
test drillings should be done in that
area to confirm if other people are
being affected and also the chance

that there should be a moratorium on the water company extracting water from the aquifer there. That would probably mitigate the problem as far as the plume expanding and also humans

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being exposed to this carcinogen, so thanks.

MR. PRINCE: Thank you.

MS. SEPPI: Thank you.

Sure we don't have any other questions or comments. Oh, I thought we were going to wrap it up, but not quite yet.

MR. MENDEZ: Thomas Mendez (inaudible) Association. You guys said something about the pumping. One of the alternatives, maybe it's three or four, you were saying if you did it once you stopped it's pretty much the likelihood of being recontaminated; is that correct?

MR. FREDERICK: Can I just clarify.

MR. PRINCE: I probably said something totally wrong.

MR. FREDERICK: No, you didn't, but I was talking about a pump and treat remedy in the classical

sense of when you are trying to remove
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contaminants. The Remedy 3 and 3A and B are hydraulic controls where you are really not trying to remove mass. You'RE just trying to prevent mass from leaving the site.

MR. MENDEZ: All right.

MR. FREDERICK: Just to clarify that for you.

MR. MENDEZ: So any of those remedies really wouldn't be getting anything out of there or just getting a tiny bit?

MR. PRINCE: A tiny bit.

MR. MENDEZ: So what's the real difference between doing that and just monitoring for the next 30 years until something better comes along, besides costs which as Bob and others have said if that's the main thing cost we would like to know and we understand the economy.

MR. PRINCE: I don't want to come out too forcefully in defending the decision that we're making, that
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we have proposed, rather, and what I

mean by that is it's a legitimate question. Is there a benefit from doing containment at that locale, yes.

Is it something where we can quantify a benefit and indicate that, in fact, if we were to do it from now into the foreseeable future, 30, 300 years from now that it would indicate improvement of the groundwater conditions somewhere down the road.

MR. MENDEZ: Yeah. Wouldn't something be better than nothing at least?

MR. PRINCE: It would be something. It's something.

MR. MENDEZ: Okay.

MR. PRINCE: I mean you know what, I don't want to sit here defending not implementing that as if oh, well, we absolutely know the right answer here.

I'm just saying at the end of the day are we going to be able to

demonstrate to ourselves or to anyone else that the aquifer is better off having done pumping for 30 years and there's not a lot of evidence that it's going to make a change, that it's going to change conditions.

MR. SPIEGEL: But removing the source you could absolutely say that is going to help to some extent. When you remove a source that's like a cancer out of a body. That person might still be sick, but they got the cancer out and that's what's at the site right now. Can you say that removing the source isn't going to help in some fashion?

MR. PRINCE: There's no evidence that it's going to change the conditions in the broader aquifer at all.

MR. SPIEGEL: But you're not answering the question. Is it going to help the groundwater eventually improve if you remove the source?

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MR. PRINCE: That's what I just said. I said, no, we don't have any evidence that that's going to happen.

MS. CUTT: There's ongoing source even if you are pumping back diffusion (inaudible).

MR. SPIEGEL: The back diffusion parameter in your model meaning a hundred percent absorption

in the matrix bound up forever, what
time period are you saying it takes to
clean it up?

MR. FREDERICK: It would never
clean up.

MR. SPIEGEL: Why?

MR. FREDERICK: Because it
would be bound up indefinitely by
absorption.

MR. SPIEGEL: The water.

MR. FREDERICK: The fracture
water.

MR. SPIEGEL: The water. The
available water, assuming the

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available water is that which is the
fracture, not that which is in the
matrix.

MR. FREDERICK: Correct.
Okay. I understand what you are
saying now.

MR. SPIEGEL: Assuming the
contaminants are a hundred percent
bound in that matrix meaning zero
backed diffusion.

MR. FREDERICK: Right.

MR. SPIEGEL: What's your
timeframe of pump and treat to clean
that. Did you run that version of the

model?
MS. CUTT: No, because that is not a feasible scenario at this site. We have a back diffusion issue. So we dealt with the actual --
MR. SPIEGEL: You shouldn't judge something (inaudible).
MR. PRINCE: Well, do we have back diffusion, yes. So why do we have back diffusion, because it's all
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bound up in the rock and none of it comes back out again, no, because some of it does.
MR. SPIEGEL: I'm trying to get you to establish a bound on your modeling. When you model you run wide extremes in parameters. Then you make judgments. You seem to make a judgment that there is no use running the model because we know what it's going to say.
MR. PRINCE: You don't understand the model, so --
MS. CUTT: We would be happy to sit down with you. Absolutely. Let's do it.
MS. SEPPI: All right. I think we are ready to wrap up. I really appreciate everybody being here

tonight. I think there were really good questions. I think the presentations were good. It was a very valuable public meeting for us, and we appreciate your comments.

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Thank you.

(Whereupon, at 10:30 o'clock p.m., the meeting was concluded.)

C E R T I F I C A T E

STATE OF NEW YORK)
) ss.
COUNTY OF NEW YORK)

I, TINA DeROSA, a Shorthand (Stenotype) Reporter and Notary Public of the State of New York, do hereby certify that the foregoing Proceedings, taken at the time and place aforesaid, is a true and correct transcription of my shorthand notes.

I further certify that I am neither counsel for nor related to any party to said action, nor in any wise interested in the result or outcome thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 13th day of August, 2012.

____

TINA DeROSA

ATTACHMENT D
Written Comments

SOUTH PLAINFIELD NEW JERSEY SITES!

TheTony to: Diego Garcia 08/10/2012 04:58 AM

History: This message has been forwarded.

Mr.Garcia-
Regarding the Cornell Dublier Site,I hope you can do as much as possible to have this site totally cleaned up so that our water is clean and not contaminated coming from this sites underground resources.
Also,In South Plainfield we have other sites that need to be deemed Super Fund Sites,such as the Chevron-Ortho Plant on Metchen Road that is causing cancer in Edison Township.Also,the former Dump which opened in 1954 and 7 days a week should be totally cleaned up and not be allowed to be used for children to play on.
Also,at the end of Hollywood Ave you can see what is coming out of the dump and on to owners property.
Mr.Robert Spiegal has this on film.
Everything was allowed to be dumped in this former open dump,tires,chemicals,refrigerators,ovens,and more.Also,various companies in the area where allowed to use it.All the town did was to cover it up with dirt.It is about 35 feet deep of rubish.Companies that manufactured everything in this entire area used that dump from 1954 until it was closed.
Then the town covered it up with dirt and put a football field on it and also a soccer field on it.
This is shame and discrace on South Plainfield.
I hope you can come to South Plainfield also with Mr.Spiegal and visit the former Dump and also the Chevron-Ortho plant on Metchen Road and see what it is doing to people in Edison Township causing cancer.They made chemicals there to treat trees and kill insects for many years.
The former Boro Park now named Veterans Park is not cleaned up either as it should have been.
It is so bad the town won't even use it as a stop for a local parade any longer.
This entire area is very toxic and dangerous and the Mayor refuses to admit this.He thinks everything is coming from underground springs.He doesn't know himself what we had here.I have been living here 60 yrs! and know first hand what was here during the manufacturing years.
I hope again you can return to South Plainfiled and visit the former dump site and they even built houses at the beginning of the original dump and people are living on it.Then visit the former Chevron-Ortho plant on Metchen Road,
Close off the old dump site and make that a super fund site and have it cleaned out totally and not used for children to play on.
Then visit Hollywood Ave and see what is seeping from the old dump on people's property.
This needs to be addressed as soon as possible.Things are very political in South Plainfield and they dont care about people.
Thank You-
Anthony Pisaniello
1-908-755-8023
South Plainfield,New Jersey

Dear Mr. Garcia,

As an interested party and duly elected representatives in the State of NJ we are extremely concerned about the proposed plan for the groundwater cleanup of the Cornell Dubilier Electronics (CDE) Superfund Site, located at 333 Hamilton Boulevard in South Plainfield, New Jersey.

I immediately urge you to extend the Operable Unit 3 (OU3) Proposed Plan public comment period for a minimum of 60 days.

The United States Environmental Protection Agency's (USEPA) selected remedy to indefinitely monitor the toxic groundwater is absolutely unacceptable. The groundwater contains cancer-causing chemicals such as Polychlorinated biphenyls (PCBs), trichloroethylene (TCE) and cis-1,2-dichloroethylene (cDCE), which are among the 26 chemicals of concern that originate from this site. We strongly believ that the USEPA should conduct a sources removal of the most toxic groundwater and directly under the site and should revisit your flawed plan to monitor the groundwater instead of cleaning it up.

The fact that the drinking water wells are pulling the contaminants towards them from the site and have been since day one disproves EPA's theory that the toxic groundwater plume is bound in the rock formation. Additionally, the USEPA needs to do a better job identifying drink water wells in area as well as testing all the homes within a one mile radius of the site for vapor intrusion.

EPA must grant this extension of time so we can review the voluminous data associated with this site as well as work with community organizations and technical experts to better understand the groundwater and surface water connection as well as the possibility this groundwater is not fully defined. From the USEPA presentation they conducted one rock core for every 200 acres and that appears to be inadequate for the purposes of identifying the 800 plus acres toxic groundwater plume.

In addition, the contaminated groundwater is seeping into the Bound Brook, which travels through South Plainfield and eventually empties into the Raritan River. Because of the high levels of PCBs in the Bound Brook, there is a "Do Not Eat Anything" advisory for all species of fish and shellfish, yet families and children are still exposed to the chemicals from playing and fishing at derbies at New Market Pond.

USEPA announced at the August 7, 2012 public meeting that the extent of this seep from the groundwater into the Bound Brook is still undetermined. In order to have the most effective and efficient cleanup plan, this extent of contamination MUST be determined PRIOR to selecting an appropriate remedy for OU3. For this reason, the comment period must be extended for a minimum of 60 days until this data is collected and available for public review.

Our offices, the Edison Wetlands Association, and the public are strongly requesting a minimum of 60 days. EPA has know about this problem for 25 years and their option for this site is to watch it for another 30 years. Waiting another 2 months will not impact your proposed cleanup option and we expect it to be granted.

If you have any questions, I can be reached at [INSERT CONTACT INFO]. Thank you in advance for taking this request into immediate consideration.

Respectfully,

Bob Spiegel
Executive Director
Edison Wetlands Association
PO Box #1208
South Plainfield, NJ 07080
Phone: (732) 321-1300
Fax: (732) 372-7866
www.edisonwetlands.org

CHAPIN ENGINEERING
A PROFESSIONAL CORPORATION
"Experience Matters"
R.W. Chapin, M.S., P.E., *President*
Board Certified Environmental Engineer

MEMO

TO: R. Spiegel, Executive Director, Edison Wetlands Association
FROM: R.W. Chapin
RE: Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey
Proposed Plan for OU-3, Contaminated Groundwater
Date: 07 August 2012

Per your request, a review of the United States Environmental Protection Agency Region 2 [USEPA] Proposed Plan [PP] to address groundwater contamination associated with the Cornell-Dubilier Electronics [CDE] has been initiated. Designated as Operable Unit 3 [OU-3] by the USEPA, the CDE groundwater and its contamination are a complex problem. This memo provides our initial comments and was prepared as a "briefing paper" for discussion at the August 7, 2012 public meeting. Additional written comments will be provided for presentation to the USEPA during the formal public comment period.

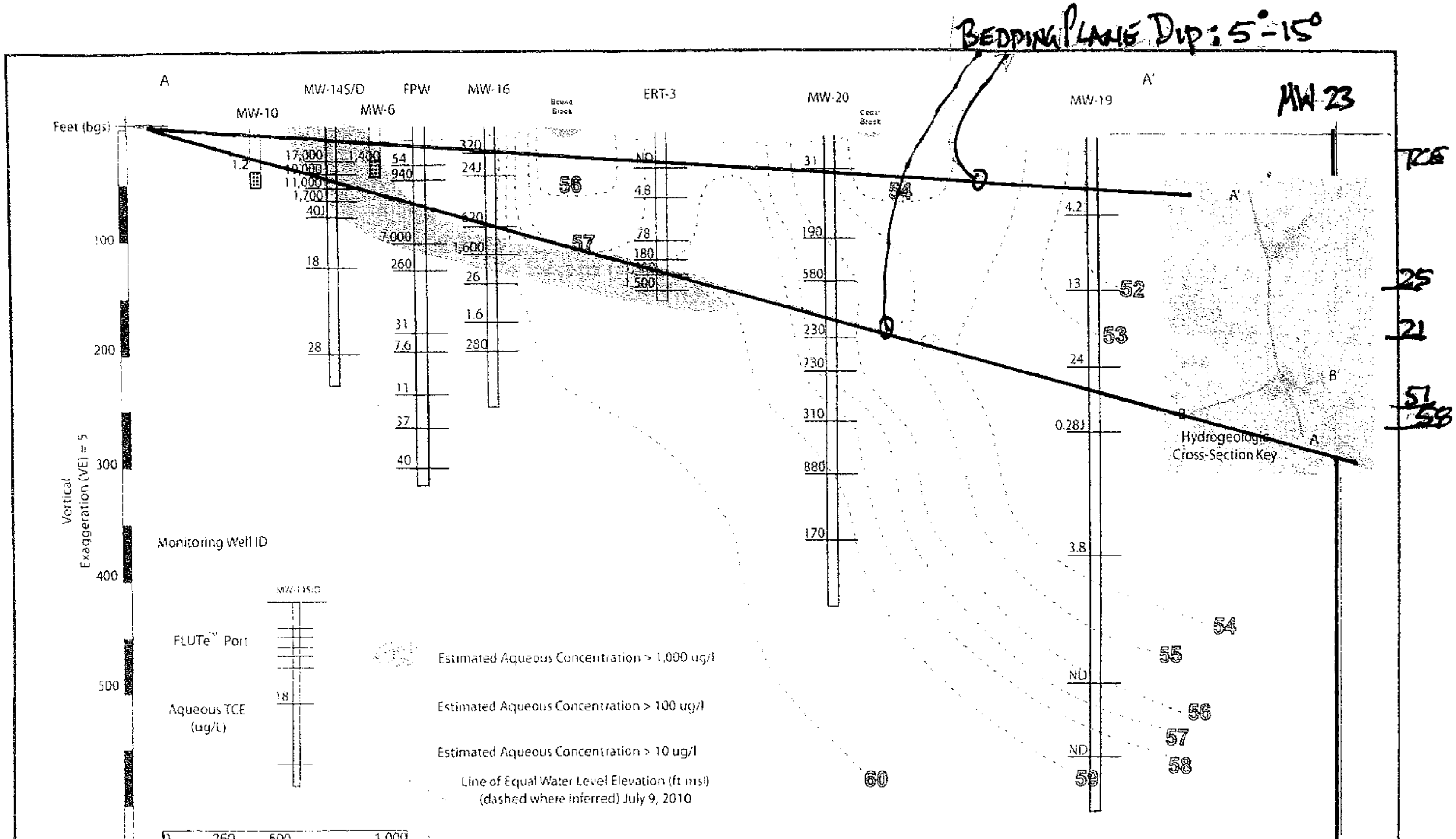
- OU-3 includes the groundwater underlying the CDE site as well as the off-site area impacted by CDE. It is difficult to locate the specific area of groundwater contamination within the PP, but the USEPA does state an area of 825 acres of the bedrock within the aquifer as being impacted. Assuming this is the total area of OU-3, this figure translates to 1.29 square miles, or 15% of the total area of the Borough of South Plainfield.
- The primary contaminants of groundwater are Trichloroethylene [TCE] a solvent used at CDE, 1,2, cis-dichloroethylene, one of TCE's biological breakdown compounds and Polychlorinated Biphenyls [PCB], a dielectric fluid used by CDE. The PP states the PCB contamination is present on-site, but not off-site; however, all data tables have not been checked to verify this statement. The presence of PCB is groundwater at the levels USEPA reports is unique, as they exceed the aqueous solubility of PCB. The PCB is highly soluble is the TCE, and the PCB has been "carried" into the groundwater by the TCE.
- As presented in the PP, the USEPA is proposing to only monitor the groundwater and imposed restrictions of its future use. This is known as Alternative 2. There will be no efforts to treat the groundwater or attack this contamination. Alternative 2 has a 30 year, estimated cost of approximately $5.7 million, which is the least costly option by a very wide margin. [Alternative 3, which is next in the cost ranking, has an estimated 30 year cost of approximately $17.4 million.]
- The PP does not state what happens after 30 years, when due to the PP's selected course of action, little change can be anticipated.
- According to the Remedial Investigation Report [RIR] for OU-3, there are major withdrawals of groundwater in the area impacted by the CDE contaminated groundwater. The following well fields, owned or operated by the Middlesex Water Company, are located within or adjacent to OU-3: Park Avenue [active], Tingley [inactive], South Plainfield [inactive], Sprague [active], and Spring Lake [inactive]. The water withdrawn by these wells does not meet New Jersey Drinking Water Standards and requires treatment to remove TCE before it is potable. Under the PP, this requirement will continue indefinitely, with the cost of that treatment being passed on to the consumer.
- The USEPA is basing its selection on a Technical Impracticability Evaluation [TI] that found TCE contamination resides within the fractured, sedimentary bedrock that resides in OU-3. USEPA states the majority of the mass of TCE resides within the rock itself and that mass will slowly leach out forever. The USEPA also states there is no practical means to "get at" that TCE.
- There were no calculations of the total mass of TCE within the 1.29 square mile TI zone [both groundwater and rock] or the total mass solely within the rock presented in the PP. This is a fundamental piece of data that must be provided by USEPA [along with the calculations.] The PP states the majority of the TCE mass resides within the rock and there is currently no means to validate that statement.
- There were rock cores analyzed to evaluate the TCE content of the fractured, sedimentary bedrock. These cores, according to the RI, came from borings that essentially lie along the center line of the contaminated area. The results of these analyses were then applied to the entire area of contamination, which assumes the TCE movement into the bedrock matrix was uniform and consistent throughout the contaminated area. There is no technical basis for this assumption, which simply could be grossly overestimating the extent of the bedrock contamination. Additional investigation is required to ascertain the true extent of TCE within the rock matrix.

27 QUINCY ROAD BASKING RIDGE, NJ 07920 908 647 8407 (fax) 908 647 6959 (email) rwc27q@verizon.net

MEMO

TO: R. Spiegel, Executive Director, Edison Wetlands Association
RE: Cornell-Dubilier Electronics Superfund Site, S. Plainfield, NJ
Proposed Plan for OU-3, Contaminated Groundwater
Date: 06 August 2012

- OU-3 is in an area of fractured, sedimentary bedrock, which has been subject to various tectonic forces that have tilted, folded and fractured these beds. As an aquifer, this formation can be characterized as heterogeneous and anisotropic [or it can be very variable]. The New Jersey Geologic Survey recently published Bulletin 77 ["Contributions to the Geology and Hydrogeology of the Newark Basin", 2010] which includes a paper describing how the bedrock formation within OU-3 behaves relative to groundwater flow and contaminant transport. This description, known as the Leaky Multi-unit Aquifer [LMA] model, has been shown to be accurate and has been applied to other New Jersey Superfund sites, such as the Rocky Hill Municipal Well Field.
- The LMA indicates contaminant transport would be down the bedding plane of the formation. Per the RI, the bedding planes dip to the northwest at a 5° to 15° angle. The TCE isocontour cross section figure form the PP is attached, and the bedding plane dip has been added. These isocontours clearly show migration down-dip. Also note the RI refers to "horizontal" bedding planes, and these are not present within OU-3.
- Modelling performed for the RI/FS and used by the TI and PP depicts the bedrock within OU-3 has having homogeneous flow characteristics; this is contrary to the LMA. No basis for using this approach is readily apparent. The project's QAPP [Quality Assurance Project Plan] addresses sampling and analysis. No verification that the computer model selected is, in fact accurate and representative of the real world was provided in the RI document, the TI or the PP. [Note: the RI, TI and PP were obtained from the South Plainfield library and are the documents provided to the library by USEPA. These do not appear to be complete; for example, documents referred to by the TI Appendix A as "short articles" are not included. Appendix A does refer to a February 2011 Technical Memo concerning modeling, but that is also not included. These documents may provide additional understanding, but all key documents must be available a revised, all inclusive set is needed to the South Plainfield Public Repository.]
- The modeling used a discrete fracture network approach to contaminant transport. No statements that the model was verified as accurate were found in the initial review of the modeling report appended to the TI. The accuracy of the model must be verified by comparison of predicted results to actual field measurements. Projections based on an unverified mathematical model are not useful.
- As stated in the RI has not achieved vertical or horizontal delineation of TCE. Limits of the proposed TI area are based on modeling, yet the actual data indicates no delineation. When there is a conflict between projected site conditions, i.e., a mathematical model, and actual field measurements, the actual data must be used. As shown of Table 5-8 of the RI, 71 of the 209 PCB congeners were present in well MW-22, which a significant distance off-site. No comparison of the congeners found to the signature congeners for the CDE site was presented. The PP summary of the Human Health Risk Assessment says PCBs hazards are unacceptable, but then states PCBs have not left the site. The data in Table 5-8 indicates that is not a valid statement and PCBs have left to CDE site. The issue of PCBs in groundwater is not addressed by the PP, and this is a significant flaw.
- The groundwater contamination from the CDE site requires full delineation. Given the intent is to only monitor and the significant potable water supply taken from a highly contaminated aquifer, it is critical to define the full areal extent of monitoring required.
- The presence of alternate TCE sources is alluded to in the PP and TI, but no concrete evidence is provided. All alternative sources must be clearly documented and their impact on OU-3 defined.
- **The Proposed Plan for Cornell-Dubilier groundwater is not based on a firm technical basis. The characterization of the groundwater system is not consistent with known conditions in the Passaic Formation.**
- **The Proposed Plan essentially, is to do nothing to address significant groundwater contamination. USEPA plans nothing other than to monitor it and allow the Park Ave potable drinking water wells to remove it.**



Note: Aqueous isoconcentration contours are conceptual in nature, and do not necessarily imply total block saturation. Colored regions should be interpreted as zones in which halo saturation is possible at the isocontour interval denoted.

R2-0022694

ARCADIS	CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE - OU3 GROUNDWATER South Plainfield, New Jersey	HYDROGEOLOGIC CROSS SECTION (N-S) July 9, 2010 with AQUEOUS CONCENTRATION ISOCONTOURS - TRICHLOROETHENE (TCE)	FIGURE 9-20

Aug 7, 2012
DIP OF BEDDING PLANE
CHAPIN ENGR. RWC

Mr. Diego Garcia Remedial Project Manager
U.S. EPA Region 2
290 Broadway, 19th Floor
New York, New York 10007-1866

RE: USEPA Proposed Plan Operable Unit 3
Cornell Dubilier Electronics Superfund Site
South Plainfield, New Jersey

September 20, 2012

Dear Mr. Garcia,

On behalf of the environmental nonprofits Edison Wetlands Association, New Jersey Food and Water Watch, New Jersey Sierra Club, New Jersey Public Employees for Environmental Responsibility (NJ PEER), [INSERT MORE] we are writing regarding the cleanup of the Cornell Dubilier Electronics (CDE) Superfund Site, located at 333 Hamilton Boulevard in South Plainfield, New Jersey. We thank the United States Environmental Protection Agency (USEPA) for extending the CDE Operable Unit 3 (OU3) Proposed Plan public comment period for an additional 30 days so that we could properly review the technical documents. We are providing the following comments as well as an attached technical memo from Chapin Engineering, dated September 19, 2012, that we fully support and request that you take into serious consideration.

The USEPA's selected remedy, "Alternative 2," to indefinitely monitor the toxic groundwater is absolutely unacceptable. The groundwater contains cancer-causing chemicals such as polychlorinated biphenyls (PCBs), trichloroethylene (TCE) and cis-1,2-dichloroethylene (cDCE), which are among the 26 chemicals of concern that originate from this site. We believe there is serious concerns with the groundwater and surface water connection. USEPA's presentation at the August 7, 2012 public meeting stated that USEPA conducted one rock core for every 200 acres. We believe that is inadequate for the purposes of identifying the 825-acre toxic groundwater plume. USEPA must **conduct additional core sampling** inorder to fully delienate this large area.

Additionally, it is known that the contaminated groundwater is seeping into the Bound Brook, which travels through South Plainfield and eventually empties into the Raritan River. Because of the high levels of PCBs in the Bound Brook, there is a **"Do Not Eat Anything" advisory for all species of fish and shellfish**, yet families and children are still exposed to the chemicals from playing and fishing at derbies at New Market Pond. The section of the Bound Brook that is contaminated also runs through the **1,250-acre Dismal Swamp Conservation Area** (DSCA), which is home to over 175 species of birds, 25 species of reptiles and amphibians, and 25 species of mammals. The DSCA also contains USEPA federal priority wetlands and is a state-recognized conservation area.

USEPA announced at the August 7, 2012 public meeting that the extent of this seep from the groundwater into the Bound Brook is still undetermined and in violation of the Clean Water Act. In order to have the most effective and efficient cleanup plan, this extent of contamination MUST be determined PRIOR to selecting an appropriate remedy for CDE OU3. For this reason, we echo the suggestion of Chapin Engineering to **immediately implement a 3-year interim measure**, which consists of utilizing the existing Spring Lake wells to recover contaminated groundwater to prevent further discharge to the Bound Brook, until the Bound Brook study (Operable Unit 4) is complete. At that time, USEPA can prepare to implement an effective permanent remedy that will remove the source areas and eventually eliminate the groundwater contamination over a short term period.

Because the drinking water wells are pulling the contaminants towards them from the site, and have been since day one, this disproves USEPA's theory that the toxic groundwater plume is bound in the rock formation. Additionally, despite the fact that South Plainfield banned drinking well water, residents are still drinking the water. Whether this entails conducting a survey or going door to door, USEPA must do a better job to **determine if there are any additional wells in the area that are unlisted**.

Furthermore, the issues of serious vapor intrusion have been skipped over entirely. USEPA must to **conduct a comprehensive vapor intrusion testing program** under the plume area and well as outside the known plume to see if the plume is in fact defined. USEPA should have learned from the Pompton Lakes DuPont Works Site that walking away from a problem like this is only going to come back to be a major public health and safety issue in the future.

Superfund requires USEPA to consider State requirements under the Applicable or Relevant and Appropriate Requirements (ARARS). New Jersey classifies, sets standards, and regulates groundwater as potable water supply, even in aquifers with no current active drinking water use. The proposed remedy did not fully consider these New Jersey ARAR's for groundwater and would essentially condemn a potable water supply for future use. Additionally, given this lost use, we request that USEPA find federal partners to **explore "Natural Resource Injury" and damage compensation**.

We highly recommend that you take our concerns seriously because your methodolgy used to select this remedy – to take no action to address sources areas and indefinitely monitor the contaminated groundwater – is technically flawed and unacceptable to the community.

If you have any questions, Robert Spiegel will serve as the point of contact. He can be reached at rspiegel@edisonwetlands.org or 732-321-1300. Thank you in advance for addressing our serious concerns.

Respectfully,

Robert Spiegel
Executive Director
Edison Wetlands Association

Bill Wolfe
Director
NJ PEER

Jim Walsh
Director
NJ Food & Water Watch

Jeff Tittel
Director
NJ Sierra Club

Debbie Mans
Executive Director
NY/NJ Baykeeper

Bill Schultz
Raritan Riverkeeper

CC: U.S. Senator Frank Lautenberg
U.S. Senator Robert Menendez
U.S. Congressman Frank Pallone
New Jersey State Senator Barbara Buono
Assemblyman Peter Barnes
Assemblyman Patrick Diegnan

Mr. Diego Garcia Remedial Project Manager
U.S. EPA Region 2
290 Broadway, 19th Floor
New York, New York 10007-1866

RE: USEPA Proposed Plan Operable Unit 3
Cornell Dubilier Electronics Superfund Site
South Plainfield, New Jersey

September 20, 2012

Dear Mr. Garcia,

On behalf of the environmental nonprofits Edison Wetlands Association, New Jersey Food and Water Watch, New Jersey Sierra Club, New Jersey Public Employees for Environmental Responsibility (NJ PEER), NY/NJ Baykeeper, Raritan Riverkeeper, and New Jersey Conservation Foundation we are writing regarding the cleanup of the Cornell Dubilier Electronics (CDE) Superfund Site, located at 333 Hamilton Boulevard in South Plainfield, New Jersey. We thank the United States Environmental Protection Agency (USEPA) for extending the CDE Operable Unit 3 (OU3) Proposed Plan public comment period for an additional 30 days so that we could properly review the technical documents. We are providing the following comments as well as an attached technical memo from Chapin Engineering, dated September 19, 2012, that we fully support and request that you take into serious consideration.

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Superfund requires USEPA to consider State requirements under the Applicable or Relevant and Appropriate Requirements (ARARS). New Jersey classifies, sets standards, and regulates groundwater as potable water supply, even in aquifers with no current active drinking water use. The proposed remedy did not fully consider these New Jersey ARAR's for groundwater and would essentially condemn a potable water supply for future use. Additionally, given this lost use, we request that USEPA find federal partners to **explore "Natural Resource Injury" and damage compensation**.

We highly recommend that you take our concerns seriously because your methodolgy used to select this remedy – to take no action to address sources areas and indefinitely monitor the contaminated groundwater – is technically flawed and unacceptable to the community.

If you have any questions, Robert Spiegel will serve as the point of contact. He can be reached at rspiegel@edisonwetlands.org or 732-321-1300. Thank you in advance for addressing our serious concerns.

Respectfully,

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Emile DeVito, Ph.D.
Manager of Science
NJ Conservation Foundation
Lifelong Resident, 54 years
Borough of South Plainfield

CC: U.S. Senator Frank Lautenberg
U.S. Senator Robert Menendez
U.S. Congressman Frank Pallone
New Jersey State Senator Barbara Buono

Assemblyman Peter Barnes
Assemblyman Patrick Diegnan

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"Experience Matters"
R.W. Chapin, M.S., P.E., *President*
Board Certified Environmental Engineer

MEMO

TO: R. Spiegel, Executive Director, Edison Wetlands Association
FROM: R.W. Chapin
RE: Cornell-Dubilier Electronics Superfund Site, S. Plainfield, NJ
Proposed Plan for OU-3, Contaminated Groundwater
Date: 19 September 2012

Per your request, a review of the United States Environmental Protection Agency Region 2 [USEPA] Proposed Plan [PP] to address groundwater contamination associated with the Cornell-Dubilier Electronics [CDE] was conducted. Designated as Operable Unit 3 [OU-3] by the USEPA, the CDE groundwater and its contamination are a complex problem. Our initial comments were provided in a memo dated August 6, 2012. That memo prepared as a "briefing paper" and it was presented and discussed at the August 7, 2012 public meeting. A copy of the August 6, 2012 memo is attached and incorporated by reference into this memo. As noted by the August 6, 2012 additional written comments would be provided to the USEPA during the formal public comment period.

This memo provides comments based on presentations made by the USEPA and its consultant [Arcadis] at the August 7, 2012 meeting. In addition, these comments are based on review of the PP; the Remedial Investigation [RI], dated June 2012; the Feasibility Study, dated June 1, 2012; and Technical Impracticability Evaluation [TI], dated June 2012, were also reviewed.

As presented in the PP, the USEPA is proposing to only monitor the groundwater and imposed restrictions of its future use. This is known as Alternative 2. There will be no efforts to treat the groundwater or attack this contamination. Alternative 2 has a 30-year, estimated cost of approximately $5.7 million, which is the least costly option by a very wide margin. [Alternative 3, which is next in the cost ranking, has an estimated 30-year cost of approximately $17.4 million.]

It is very important to note that the PP for OU-3 DOES NOT consider the effects of the discharge of contaminated groundwater upon the Bound Brook. The contaminated groundwater **is** discharging into the Bound Brook, and it has been actively discharging into the Bound Brook since the Spring Lake potable wells ceased operation circa 2003.

Selected Plan as Presented at the August 7, 2012 Public Meeting:

As presented at the public hearing, the USEPA's decision to propose Alternative 2 is based on the results of computer modelling of the groundwater that concluded there was no practical means to clean up the groundwater. It was stated by USEPA that the mass of CVOC [chlorinated volatile organic compounds] within the rock itself is so great that it would maintain the current levels of groundwater contamination for hundreds of years.

Relative to the active discharge of contaminated groundwater into the Bound Brook, USEPA stated that issue will be addressed as part of OU-4; consequently, actions could be taken to eliminate/control the contaminated groundwater discharge into the Bound Brook at sometime in the future. BUT, USEPA did not specify when such an action might be taken.

During the public hearing, I asked two key questions concerning the PP for OU-3. These are noted below, along with the response to each elicited.

1. What is the total mass of CVOC within the bedrock? The response was we do not know.
2. The RI and FS use two terms to describe the CVOC within the bedrock matrix: adsorbed and absorbed. Which term accurately describes how the CVOC exists within the bedrock? The response was we are not sure which it is.

Comments concerning the PP in light of these responses and review of the documents follow.

MEMO

RE: Cornell-Dubilier Electronics Superfund Site, S. Plainfield, NJ
Proposed Plan for OU-3, Contaminated Groundwater
Date: 19 September 2012

Comments: The selected PP is equivalent to the No Action alternative: Under Superfund the USEPA is required to consider the effects of a "No Action' alternative, which is defined as taking no action to reduce the toxicity, mobility or volume of contaminated groundwater. The only proposed action under the PP is to monitor groundwater quality for 30 years and implement institutional controls, i.e., prohibit new groundwater use. As a practical matter, it is very doubtful that the NJDEP would issue a water use permit for any new well is this area. Consequently, the USEPA has essentially selected no action for a significant groundwater contamination problem that is directly and actively impacting major potable water supplies. The USEPA must to inform the public that they are actually doing nothing.

Comment: The selected PP transfers the cost of groundwater cleanup directly to the public: The public potable water supplies impacted by CDE must treat their water to remove CVOC prior to distribution. Doing nothing to address the CDE groundwater contamination allows that contamination to continue to impact these potable water supplies. Consequently, CDE contaminants must be removed before that water may be consumed and the cost of that treatment becomes part of the water bills of the customers of the Middlesex Water Company. USEPA is requested to provide other specific locations where its Superfund program transferred the cost, hence the responsibility, to the general public. Those costs should be borne by the responsible party for the CDE site.

Comment: Contaminated groundwater discharge into the Bound Brook must be address now: The USEPA has decided to allow the contaminated groundwater to continue to discharge into the Bound Brook while the OU-4 work is on-going. Historic pumping of the Spring Lake wells prevented the discharge into the Bound Brook. The Bound Brook is a critical receptor due to its recreational use and aquatic resources. What are the impacts of this on-going discharge? USEPA should include control of contaminated groundwater discharge in its plan for OU-3. Delaying will be detrimental to the Bound Brook.

Comment: The modelling predictions MUST be verified via a quantitative mass evaluation: At the public hearing it was stated that the mass of the contamination within the rock matrix is not known. The RI modelling was reviewed to elicit specific quantifications of mass; none were found. Yet, the modelling as currently configured has the mass within the rock maintaining current groundwater contaminant levels for hundreds of years, and this is THE basis for the USEPA choosing to do nothing. Several technical issues that **must be considered** and **questions that require answers** before this modelling may be deemed quantitative are provided below.

- Analyses of rock cores were used to define the contamination within the rock. Those cores were taken from a line of borings that reside along the north-south center line of the groundwater contamination. No cores were analyzed at any points either east or west of that line. What is the rock contamination profile along an east west axis? Is it actually the same? Or is there a gradient? What mass of CVOC is present along the north-south axis? And is it the same along an east-west line?
- As noted above, the terms adsorbed and absorbed are both used, but nowhere is it stated which controls. If the CVOC were adsorbed completely [or electrochemically bound within the rock matrix] there would be little or no movement out of the matrix. Conversely, if the CVOC were absorbed they would be in solution and free to move out of the rock. Obviously, the degree to which the bedrock will act as a source for continuing CVOC contamination of groundwater depends on whether adsorption or absorption controls. The documents reviewed do not define which process controls the bedrocks behavior. The mechanism controlling movement from the bedrock must be explicitly defined.
- As presently configured the modelling assumes there is sufficient mass of CVOC within the bedrock to maintain current contamination levels. What mass is required to do that? Does the bedrock contain that required mass? Since the model obviously assumes it does, how is that known? Was the same bedrock concentration assumed throughout the entire modelled zone?
- The concentrations of CVOC within the rock matrix was "calculated" using the pore water analyses. No technical appendix provides those calculations and no validation of those calculations was found in the documents reviewed. As this is a fundamental factor in the modelling these calculations must be validated.

CHAPIN ENGINEERING
A PROFESSIONAL CORPORATION
"Experience Matters"

MEMO

RE: Cornell-Dubilier Electronics Superfund Site, S. Plainfield, NJ
Proposed Plan for OU-3, Contaminated Groundwater
Date: 19 September 2012

Alternative RS: Interim Pump and Treat with Quantification of Bedrock Contaminant Load

Simply put, we do not know the mass of contamination present or how that mass will respond if it is "stressed". The modelling assumes a slow steady diffusion out of the bedrock for a long time, but this is based on assumed mass transfer parameters.

At the same time, continued discharge of contaminated groundwater is the Bound Brook will occur for several years, at least, while investigations are complete and alternative remedies are evaluated. Action should be taken sooner.

Historically, the Spring Lake wells acted as an effective pumping system that prevented the discharge to the Bound Brook. Those wells a still in place, or the infrastructure of a recovery system essentially still exists. The capital expenditures required to use it as a recovery system should not be large.

Utilizing the Spring Lake wells to recover contaminated groundwater to prevent discharge to the Bound Brook should be implemented **now**. At the same time, the monitoring program of the PP should be modified such that is provides data on the key question, which is: what is the rate of CVOC movement out of the bedrock? This is the only way to truly know if those predictions are accurate.

It is recommended that this interim remedial measure be applied for a 3-year period. By that time the OU-4 work should be complete.

27 QUINCY ROAD BASKING RIDGE, NJ 07920 908 647 8407 (fax) 908 647 6959 (email) rwc27q@verizon.net

CHAPIN ENGINEERING
A PROFESSIONAL CORPORATION
"Experience Matters"
R.W. Chapin, M.S., P.E., *President*
Board Certified Environmental Engineer

MEMO

TO: R. Spiegel, Executive Director, Edison Wetlands Association
FROM: R.W. Chapin
RE: Cornell-Dubilier Electronics Superfund Site, S. Plainfield, NJ
Proposed Plan for OU-3, Contaminated Groundwater
Date: 06 August 2012

Per your request, a review of the United States Environmental Protection Agency Region 2 [USEPA] Proposed Plan [PP] to address groundwater contamination associated with the Cornell-Dubilier Electronics [CDE] has been initiated. Designated as Operable Unit 3 [OU-3] by the USEPA, the CDE groundwater and its contamination are a complex problem. This memo provides our initial comments and was prepared as a "briefing paper" for discussion at the August 7, 2012 public meeting. Additional written comments will be provided for presentation to the USEPA during the formal public comment period.

- OU-3 includes the groundwater underlying the CDE site as well as the off-site area impacted by CDE. It is difficult to locate the specific area of groundwater contamination within it PP, but the USEPA does state an area of 825 acres of the bedrock within the aquifer as being impacted. Assuming this is the total area of OU-3, this figure translates to 1.29 square miles, or 15% of the total area of S. Plainfield Borough.
- The primary contaminants of groundwater are Trichloroethylene [TCE] a solvent used at CDE, 1,2, cis-dichloroethylene, one of TCE's biological breakdown compounds and Polychlorinated Biphenyls [PCB], a dielectric fluid used by CDE. The PP states the PCB contamination is present on-site, but not off-site; however, all data tables have not been checked to verify this statement. The presence of PCB is groundwater at the levels USEPA reports is unique, as they exceed the aqueous solubility of PCB. The PCB is highly soluble is the TCE, and the PCB has been "carried" into the groundwater by the TCE.
- As presented in the PP, the USEPA is proposing to only monitor the groundwater and imposed restrictions of its future use. This is known as Alternative 2. There will be no efforts to treat the groundwater or attack this contamination. Alternative 2 has a 30 year, estimated cost of approximately $5.7 million, which is the least costly option by a very wide margin. [Alternative 3, which is next in the cost ranking, has an estimated 30 year cost of approximately $17.4 million.].
- The PP does not state what happens after 30 years, when due to the PP's selected course of action, little change can be anticipated.
- According to the Remedial Investigation Report [RIR] for OU-3, there are major withdrawals of groundwater in the area impacted by the CDE contaminated groundwater. The following well fields, owned or operated by the Middlesex Water Company, are located within or adjacent to OU-3: Park Avenue [active], Tingley [inactive], South Plainfield [inactive], Sprague [active], and Spring Lake [inactive]. The water withdrawn by these wells does not meet NJ Drinking water Standards and requires treatment to remove TCE before it is potable. Under the PP, this requirement will continue indefinitely, with the cost of that treatment being passed on to the consumer.
- The USEPA is basing its selection on a Technical Impracticability Evaluation [TI] that found TCE contamination resides within the fractured, sedimentary bedrock that resides in OU-3. USEPA states the majority of the mass of TCE resides within the rock itself and that mass will slowly leach out forever. The USEPA also states there is no practical means to "get at" that TCE.
- There were no calculations of the total mass of TCE within the 1.29 square mile TI zone [both groundwater and rock] or the total mass solely within the rock presented in the PP. This is a fundamental piece of data that must be provided by USEPA [along with the calculations.] The PP states the majority of the TCE mass resides within the rock and there is currently no means to validate that statement.
- There were rock cores analyzed to evaluate the TCE content of the fractured, sedimentary bedrock. These cores, according to the RI, came from borings that essentially lie along the center line of the contaminated area. The results of these analyses were then applied to the entire area of contamination, which assumes the TCE movement into the bedrock matrix was uniform and consistent throughout the contaminated area. There is no technical basis for this assumption, which simply could be grossly overestimating the extent of the bedrock contamination. Additional investigation is required to ascertain the true extent of TCE within the rock matrix.

CHAPIN ENGINEERING
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"Experience Matters"

MEMO

TO: R. Spiegel, Executive Director, Edison Wetlands Association
RE: Cornell-Dubilier Electronics Superfund Site, S. Plainfield, NJ
Proposed Plan for OU-3, Contaminated Groundwater
Date: 06 August 2012

- OU-3 is in an area of fractured, sedimentary bedrock, which has been subject to various tectonic forces that have tilted, folded and fractured these beds. As an aquifer, this formation can be characterized as heterogeneous and anisotropic [or it can be very variable]. The New Jersey Geologic Survey recently published Bulletin 77 ["Contributions to the Geology and Hydrogeology of the Newark Basin", 2010] which includes a paper describing how the bedrock formation within OU-3 behaves relative to groundwater flow and contaminant transport. This description, known as the Leaky Multi-unit Aquifer [LMA] model, has been shown to be accurate and has been applied to other NJ Superfund sites, such as the Rocky Hill Municipal Well Field.
- The LMA indicates contaminant transport would be down the bedding plane of the formation. Per the RI, the bedding planes dip to the northwest at a 5° to 15° angle. The TCE isocontour cross section figure form the PP is attached, and the bedding plane dip has been added. These isocontours clearly show migration down-dip. Also note the RI refers to "horizontal" bedding planes, and these are not present within OU-3.
- Modelling performed for the RI/FS and used by the TI and PP depicts the bedrock within OU-3 has having homogeneous flow characteristics; this is contrary to the LMA. No basis for using this approach is readily apparent. The project's QAPP [Quality Assurance Project Plan] addresses sampling and analysis. No verification that the computer model selected is, in fact accurate and representative of the real world was provided in the RI document, the TI or the PP. [Note: the RI, TI and PP were obtained from the South Plainfield library and are the documents provided to the library by USEPA. These do not appear to be complete; for example, documents referred to by the TI Appendix A as "short articles" are not included. Appendix A does refer to a February 2011 Technical Memo concerning modeling, but that is also not included. These documents may provide additional understanding, but all key documents must be available a revised, all inclusive set is needed to the South Plainfield Public Repository.]
- The modelling used a discrete fracture network approach to contaminant transport. No statements that the model was verified as accurate were found in the initial review of the modeling report appended to the TI. The accuracy of the model must be verified by comparison of predicted results to actual field measurements. Projections based on an unverified mathematical model are not useful.
- As stated in the RI has not achieved vertical or horizontal delineation of TCE. Limits of the proposed TI area are based on modelling, yet the actual data indicates no delineation. When there is a conflict between projected site conditions, i.e., a mathematical model, and actual field measurements the actual data must be used. As shown of Table 5-8 of the RI, 71 of the 209 PCB congeners were present in well MW-22, which a significant distance off-site. No comparison of the congeners found to the signature congeners for the CDE site was presented. The PP summary of the Human Health Risk Assessment says PCBs hazards are unacceptable, but then states PCBs have not left the site. The data in Table 5-8 indicates that is not a valid statement and PCBs have left to CDE site. The issue of PCBs in groundwater is not addressed by the PP, and this is a significant flaw.
- The groundwater contamination from the CDE site requires full delineation. Given the intent is to only monitor and the significant potable water supply taken from a highly contaminated aquifer, it is critical to define the full areal extent of monitoring required.
- The presence of alternate TCE sources is alluded to in the PP and TI, but no concrete evidence is provided. All alternative sources need to be clearly documented and their impact on OU-3 defined.
- The PP does not appear to be based on a firm technical basis. The characterization of the groundwater system is not consistent with known conditions in the Passaic Formation. The PP, essentially, is to do nothing to address a significant contamination other than monitor it and allow the Park Ave wells to remove it.

27 QUINCY ROAD BASKING RIDGE, NJ 07920 908 647 8407 (fax) 908 647 6959 (email) rwc27q@verizon.net

Fwd: FW: Survey: South Plainfiled Local Water Table History
Eric Slauson
to:
Diego Garcia
08/15/2012 01:12 AM
Cc:
Antonia Grozdanova
Hide Details
From: Eric Slauson <eroyson@gmail.com>

To: Diego Garcia/R2/USEPA/US@EPA

Cc: Antonia Grozdanova <antoniabg@gmail.com>

History: This message has been forwarded.

Hi Garcia,

I live on 108 Elizabethtown Ct in South Plainfield across the street from Glen who is at the bottom of this email chain. I moved here in 2009 and I have actually noticed a change in the amount of water and silt running into my sump pumps in the short time that i've lived here. We have two sump pumps in the basement with a drainage system under the basement slab that routes water right to the sumps. We also have weep holes installed around the entire basement. This system is more then sufficient to handle the current situation except when the power goes out. If the power goes out then the basement will flood within hours. While I'm not sure of the exact amount of water running into the sumps I would say that it is more then 1 gallon per minute at any given time and way more if it rains for an extended period of time.

When I first moved in, there was no indication of water in the actual basement but both of the sumps were pretty much running constantly.

Since 2011 I've really started having trouble with silt buildup within the pipes that remove water from the sumps. I've burned out two sump pumps so far and would say that every 3 months or so the silt builds up so much that one sump can no long push water and has to be flushed with a high pressure water bladder. If that doesn't work then I also bought a 25ft snake which usually frees it up enough to work again. I can understand that this may be just because of the age of the system or a bad design so I really didn't think much of it and was going to replace the inside pipes. I did just replace the outside pipes earlier this summer as they were completely clogged and both sumps could not function.

One change that I have noticed in 2012 is that moisture is now creeping up through cracks in the basement floor and some of the drain holes in the actual sump are now shooting water out of them constantly. In the past some of these holes would cake up with silt and would shoot water for the first half hour or so after a cleaning but I cleaned one out over a month ago and its still shooting water all the time.

Another change I've noticed is that the silt is now more like sand. In 2011 I had to clean out the pipes under the basement slab as they were filled red silt and clay. This was pretty easy and the pressure bladder took care of it. Now, less then a year later they are fill half way with what looks like sand. I've tried to blow that out with the pressure bladder but the stuff doesn't budge.

If I may add one more thing. There seems to be a lot of ground water on left side of the house if looking at it from the street. I never water that area of the lawn and even during the hottest days this year the ground was moist to the touch and the grass was beautiful. Those are the best days of course. When it rains that area is completely water logged and you may sink up your ankles even days after the rain is over. I have a similar problem in the back yard with drainage. When it rains for extended periods of time the right side of the back yard may get over 8 inches deep in the lowest sections of the yard.

Thank you for your time.

Eric Slauson
108 Elizabethtown Ct
South Plainfield, NJ 07080

-------- Original message --------
Subject: FW: Survey: South Plainfiled Local Water Table History
From: Cynthia Freund <cynth1@msn.com>
To: Antonia Fields <antonia.fields@gmail.com>,Eric Slauson <eroyson@yahoo.com>
CC: FW: Survey: South Plainfiled Local Water Table History

Antonia and Eric,
This may concern you too.

Cynthia Freund

Prudential New Jersey Properties

3 Amboy Avenue

Metuchen NJ 08840

908-447-6980

Date: Sat, 11 Aug 2012 21:53:01 +0000
From: larrymurrell@comcast.net
To: rlcallanan@gmail.com; deemccriskin@verizon.net; cynth1@msn.com
CC: DancingIrisPhoto@aol.com; inmanmold@aol.com; Charles.Shankle@dot.state.nj.us; culexkranz@yahoo.com
Subject: Survey: South Plainfiled Local Water Table History

All,

If you want to have your basement flooding issues/soil water-logging/high sump pump activity/swimming pool cracking isses now is the time to send the information to USDEP. It is especially important to note the date at which the issue started to occur, and if the problem continued to increase over time in severity.

It was disclosed at a public meeting on August 7th, 2012 that Middlesex Water Company shut off pumping in 2003 which caused an immediate 5 foot rise in the water table in the vicinity of Spring Lake Park. We want to know if this 2 million gallon pumping-cessation has slowly resulted in basement flooding and other issues in South Plainfield. [There is a good model to explain horizontal water movement over clay bed rock in South Plainfield, according to Alice Tempel.

For the next two weeks there is an open time period for the public to respond to issues/concerns/add information re. the public meeting held on Tuesday that the United States Dept. of Environmental Protection) USDEP held.

The email address is: garcia.diego@epa.gov

The telephone number is 212 637-4947.

Pete Goti who lives on 10th Street has agreed to discuss this issue with residents that he knows have had difficulties. He wants to contribute to an inclusive survey of S.P. residents as we learned recently that in 2003 pumping of water at Spring Lake Park was stopped. Pumping was stopped due to high levels of Trichloroethylene in the water due to the Cornell-Dubilier Electronics Super Fund site.

Pete and I have agreed we want to get a proper survey completed, even though it may take years to complete.

The situation seems to be getting progressively worse. I spoke with a woman this Spring that lives close to Franklin School and her sump pump started in Feb. 2012 and has never stopped. For the previous 14 years only minor off-and-on during Irene type storms. But no more. Things are changing re. the water table.

As the residents on Elizabethtown Court know, things have gotten a lot worse over time.

If one puts it all together, the information could make a real contribution.

All of your responses are important to document and put into a document that can be submitted to our Borough Clerk.

So, if you do send a response in to NJDEP please cc this email and I will make a file of all responses.

We are trying to convince the Borough to initiate a survey on the Borough web page, or have the Observer put all this information together in an article to collect the information.

Regards,

Larry

From: inmanmold@aol.com
To: larrymurrell@comcast.net
Sent: Saturday, August 11, 2012 12:14:10 PM
Subject: Re: Local Water Table

Larry,
Just spoke to Roger, he's not sure of the exact year, but it was between 5 to 7 years after he moved in that he first noticed the pump start working. That would put it between 2003 and 2005. The 2007 date was when the pump was working non stop.

Two other houses on the block had to have contractors come in and put a second sump pump pit in and redo the french drain system at a cost of almost 20 grand. and they still have issues.

At least 5 of us on the block had to get generators this past year (portable, or whole house) to keep the sump pumps running when the power goes out, even for the shortest time. It doesn't take long for the pits to fill up and spill over.

Larry, you asked if you could forward the email I sent you the other day. I have no problem with that.

Regards,
Glen

Urgent! Request for extension on Cornell Dubilier OU3 Proposed Plan Public Comment Period
dana
to:
Diego Garcia
08/17/2012 04:28 PM
Cc:
John Prince, Judith Enck, "Zoe Baldwin", "Sen. Buono", "Asm. Diegnan", "Asm. Barnes", "Carolyn Fefferman", "Tuley Wright", Pat Seppi, Walter Mugdan
Hide Details
From: <dana@edisonwetlands.org> Sort List...

To: Diego Garcia/R2/USEPA/US@EPA

Cc: John Prince/R2/USEPA/US@EPA, Judith Enck/R2/USEPA/US@EPA, "Zoe Baldwin" <Zoe_Baldwin@lautenberg.senate.gov>, "Sen. Buono" <SenBuono@njleg.org>, "Asm. Diegnan" <AsmDiegnan@njleg.org>, "Asm. Barnes" <AsmBarnes@njleg.org>, "Carolyn Fefferman" <Carolyn_Fefferman@menendez.senate.gov>, "Tuley Wright" <Tuley.Wright@mail.house.gov>, Pat Seppi/R2/USEPA/US@EPA, Walter Mugdan/R2/USEPA/US@EPA

3 Attachments

icon_sm_facebook.gif icon_sm_twitter.gif att01clq.pdf

Dear Mr. Garcia,

On behalf of the environmental nonprofits Edison Wetlands Association, Clean Ocean Action, New Jersey Public Employees for Environmental Responsibility (NJPEER), New Jersey Audubon Society, New Jersey Sierra Club, New Jersey Conservation Foundation, and Raritan Riverkeeper, please accept our attached letter as part of the public record for the Cornell Dubilier Electronics (CDE) Operable Unit 3 (OU3) Proposed Plan.

We urge the United States Environmental Protection Agency to immediately extend the CDE OU3 Proposed Plan public comment period for a <u>minimum of 60 days</u>. It is currently scheduled to close on Monday, August 20, 2012, which is clearly deficient for the reasons outlined in our attached letter.

Please confirmation that you have received this email. Thank you in advance for taking immediate action to fulfill our request.

Respectfully,

Dana Patterson
Program Supervisor
Edison Wetlands Association
732-321-1300

Follow EWA:
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NewGreenMedia.tv
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Twitter

Please consider the environment before printing this e-mail.

Jane Tousman
14 Butler Rd
Edison NJ 08820
Phone: 908-561-5504
Fax: 908-561-5504
Jdtous@aol.com

August 17, 2012

Mr. Diego Garcia
Remedial Project Manager
U. S. EPA Region 2
290 Broadway, 19th Floor
New York, New York 10007-1866

Dear Mr. Garcia,

As an activist, and long term member of the Edison Open Space Committee, I urge you to grant more time for a thorough investigation of the Cornell-Dubilier Electronics site in South Plainfield.

While I do appreciate the fact that you have placed limitations on the use of the water coming off the site, I still have problems with the questions raised at your recent hearing in South Plainfield. The wells mentioned in documents affect much of the water supply for Middlesex County.

Further remedies for the most toxic substances such as PCB's and TCE's which travel in our ground water need to be found. The health, safety and welfare of our citizens of the area is riding on your professional expertise. Many questions were raised at the hearing which need to be resolved.

Much has been done for the biggest conservation area we have in the area, the Dismal Swamp Conservation area. More protection is needed to protect the Bound Brook and all the areas it impacts.

You have the power to grant an extension for comments and study to protect the people of the area as well as an opportunity to save this vast conservation area. Use it.

Sincerely,
Jane Tousman

Jane Tousman
Member of the Edison Open Space Committee

CC: The Edison Wetlands Association
The Edison Open Space Committee

South Plainfield PCB,etc.. cleanup
Jeffrey Ballschmieder
to:
Diego Garcia
08/25/2012 12:23 PM
Hide Details
From: Jeffrey Ballschmieder <jeffreynyc1@gmail.com>

To: Diego Garcia/R2/USEPA/US@EPA

History: This message has been forwarded.

Dear Mr.Garcia,

Thank you for all the efforts put forth to clean up our town so far. I live on Spicer Ave and have been concerned from the get go on contamination from the cleanup itself. This you know, health wise, cannot be good for anyone in the surrounding area espcially not knowing long term effects on the body. As we have already lost the values of our homes from the site and as well as the health risks and devaluations of our homes,I implore the EPA to finish the rest of the cleanup for our health,value of our property,peace of mind for our future generations that will suffer from the effects of these poisons. Thank you again for your all your time and help in resolving this issue.

Sincerely,

Jeffrey C Ballschmieder
601 Spicer ave
South Plainfield,NJ 07080

Fwd: Local Water Table Impact on Basement Flooding and Soil Water-logging
larrymurrell
to:
Diego Garcia
08/13/2012 12:53 AM
Cc:
"inmanmold (Glen) Barlics", Jeanmarie Fultz, patfeeneymurrell murrell
Hide Details
From: larrymurrell@comcast.net

To: Diego Garcia/R2/USEPA/US@EPA

Cc: "inmanmold (Glen) Barlics" <inmanmold@aol.com>, Jeanmarie Fultz <jmf627@yahoo.com>, patfeeneymurrell murrell <patfeeneymurrell@comcast.net>

History: This message has been forwarded.

Hi Garcia,

In the below email I have outlined serious basement and soil water-logging issues in our sub-division of South Plainfield that were sent to our mayor, Matthew Anesh this evening, August 13. The problems in this email and those outlined in an additional email from Glen Barlics we would like to add to the public response to the Public Meeting held August 7, 2012 in South Plainfield.

I and other residents think a survey should be done of basement sump pump activity, basement flooding, and soil water-logging issues in South Plainfield over the past 20 years so that we can better understand how the shutting of the four pumping stations around Spring Lake Park in 2003 due to VOC levels in the water has impacted resident properties.

Regards,

Larry

From: larrymurrell@comcast.net
To: "matthew anesh" <matthew_anesh@verizon.net>
Cc: "Alice Tempel" <atempel@southplainfieldnj.com>, "Paul McCullen" <mccullenp@gmail.com>, "Glenn Cullen" <gcullen@southplainfieldnj.com>, "Jeanmarie Fultz" <jmf627@yahoo.com>, "spnaturetrails" <spnaturetrails@verizon.net>, "Christopher A. Cioffi"

<christopher.cioffi@comcast.net>, "Charles Shankle" <Charles.Shankle@dot.state.nj.us>, "John Kranz" <culexkranz@yahoo.com>
Sent: Monday, August 13, 2012 12:25:49 AM
Subject: Local Water Table Impact on Basement Flooding and Soil Water-logging

Matt,

Glen gave me permission to forward the email he sent to me, see critical information below.

My immediate neighbor, Artie Luber has had his sump pumps burn out with this yellow silt entering his sump pump well.

The new dry well in my yard is filled with this same yellow silt that Artie Luber and people on Elizabethtown Court have experienced.

My neighbor diagonal across my backyard fence, Sedrick Johnson has had two floods in the past 10 years with $ 5000 loss for each flood.

10013 O'keefe Ln, the closest house to the McDonough Street entry to Walnut Street Park, has had to add a second sump pump to prevent basement flooding just five years ago.

Rich McCriskin lost his swimming pool during the fall of 2011, and he has lost many pines and a huge oak tree to water-logging conditions that has also impacted my property:

My basement slab has started to flood after every rain as of the Fall of 2011, the flooding occurs by water wicking through the slab. This has never happened in the 30 years I have lived in this house.

All of this basement flooding problems, combined with water-logging, is painting a picture that the the local water table has been increasing in our sub-division in the past 10 years. And the water table has been even with the soil in my backyard after almost every rain. The drought did not impact the water-logging of three residents properties adjacent to my property: Bob Smith, Sedrick Johnson, and Artie Luber.

Please read below email from Glen, who lives on Elizabethtown Court.

Regards,

Larry

From: inmanmold@aol.com
To: larrymurrell@comcast.net
Sent: Friday, August 10, 2012 5:50:37 PM

Subject: Re: Local Water Table

Hi Larry,

Your Email from the other day was a good insight to what has most likely caused the drastic change in our sub division. 5 feet rise in the water table is huge! If the water company shut down the last pumping station in 2003, that is about the time, Roger on Elizabethtown court started seeing his sump pump start running. From the 5 yrs prior, that he lived in the house he had to pour water in the sump hole to make sure the pump was working. Now it runs non-stop like everyone in the area. As I told you before, something had to changed in the area, upstream,underground? That's when you found some problems at the Franklin School area.

Last years storm that flooded town hall and that whole area like never before had to be a result of the shutting down of those pump stations? The town had to know what was going on and the effects it would have? What's the chance of getting the pump stations back up and running?

For the past two years, my basement has developed a continues flow of water/slit coming thru the block walls in my small addition. There is no french drain in that area so the water just flows across the floor and into the sump pit. When I first move in, some 14 years ago I sealed all the walls with a water proof coating. Guess I need to figure out what else is going to plug the dike!

The property on Elizabethtown Court near the cul de sac started sump pump activity between 2003 and 2005. The 2007 date was when the pump was working non stop.

Two other houses on the block had to have contractors come in and put a second sump pump pit in and redo the french drain system at a cost of almost 20 grand. and they still have issues.

At least 5 of us on the block had to get generators this past year (portable, or whole house) to keep the sump pumps running when the power goes out, even for the shortest time. It doesn't take long for the pits to fill up and spill over.

Larry, you asked if you could forward the email I sent you the other day. I have no problem with that.

Thank's for keeping me informed.

Regards,
Glen

Superfund Site
Leslie Tunstall
to:
Diego Garcia
08/27/2012 01:42 PM
Cc:
jeff.tittel
Hide Details
From: Leslie Tunstall <lctunstall54@aol.com>

To: Diego Garcia/R2/USEPA/US@EPA

Cc: jeff.tittel@SierraClub.org

History: This message has been forwarded.

To Whom It May Concern:

As a resident of the neighborhood of the Cornell-Dubilier Superfund site I wish to voice my comments regarding the EPA's intention to merely monitor and restrict groundwater usage rather than effect a vigorous and genuine clean-up of the site.

A monitor-and-restrict plan for this site is completely inadequate. This site is embedded in the heart of a heavily residential and recreational area. Many local people, myself included, use the lands around this area for outdoor enjoyment. Nothing short of an aggressive and thorough site remediation is acceptable for this location.

It is unfortunate that the EPA has expended so much money on the site thus far due to the agency's own ineptitude, inefficiency, incompetence, and general bureaucratic foot-dragging; however, this is not really the fault of the local citizenry.

If the EPA wants to be done with this site, the only ethical and responsible course of action is just to bite the bullet and DO THE CLEAN-UP--once and for all!

The claim that it's "too expensive" or "there isn't enough money in the budget" to do the job right is merely proof of EPA's own incompetence, wastefulness and inability to perform its job. Don't make yourselves look worse than you already do, EPA. To borrow the Nike slogan: JUST DO IT.

Sincerely,

Leslie C. Tunstall

KLEINFELDER
Bright People. Right Solutions.

Certified Mail Number: 7010 1060 0000 0472 5362

Date: APR 1 3 2011

Todd Muccilli
2133 Audubon Avenue
South Plainfield, NJ 07080

Re: Potable Well Sampling Results for
2133 Audubon Avenue,
South Plainfield, NJ 07080

Dear Mr. Muccilli,

On March 18, 2011, Kleinfelder East, Inc. (Kleinfelder), on behalf of ExxonMobil Environmental Services Company (ExxonMobil), sampled the potable well located at 2133 Audubon Avenue, South Plainfield, New Jersey as part of the environmental investigation being conducted at Exxon Facility # 33955 located at 2300 Park Avenue, South Plainfield, New Jersey. The environmental investigation is being conducted under the direction of the New Jersey Department of Environmental Protection (NJDEP). The potable well is located approximately 1,000 feet northeast of the site.

The potable well sample was collected before the filtration system after flushing the well for approximately 15 minutes. The sample was analyzed for volatile organic compounds plus a ten peak library search (VO+10), including methyl tertiary butyl ether (MTBE) and tertiary butyl alcohol (TBA) via USEPA Method 524.2 and lead via USEPA Method 200.8. A summary of the results is presented in the table below. The well information form **(Appendix A)** and laboratory analytical data package **(Lab Appendix B)** are attached for your reference.

Compound	NJDEP Drinking Water Standard	Effluent
1,1-Dichloroethane	50	0.14 J
1,1-Dichloroethylene	2	0.47 J
Chloroform	Standard does not exist	0.17 J
1,1,1-Trichloroethane	30	0.31 J
Trichloroethylene	1	0.20 J
Lead	15	5.1

J indicates an estimated concentration
Results are presented in micrograms/liter (ug/L)

If you have any questions regarding these results, please contact the Middlesex County Public Health Department at (732) 745-3100.

If you have any other questions or require any additional information, please contact the undersigned at (609) 584-5271, or via email at mmcgowan@kleinfelder.com.

Very Truly Yours,
Kleinfelder East, Inc.

Kaitlin Tyrol

Kaitlin Tyrol
Environmental Scientist

Michael McGowan, CHMM
Project Manager

Mr. Diego Garcia
Remedial Project Manager
United States Environmental Protection Agency
290 Broadway, 19th Floor
NY, NY 10007

August 17, 2012

RE: Cornell Dubilier Electronics Superfund Site
Proposed Plan for Operable Unit 3
South Plainfield, New Jersey

Dear Mr. Garcia,

As an interested party in the cleanup of the Cornell Dubilier Superfund Site in South Plainfield, new Jersey, I am extremely dissatisfied with the United States Environmental Protection Agency's (USEPA) recent Proposed Plan for Operable Unit 3.

As a resident of a neighboring town that comes into direct contact with the Bound Brook, I have followed this cleanup in great detail and I have found it to be rather disturbing. While this Proposed Plan may have originated with the best of intentions, nevertheless, I have found it (specifically Alternative 2 of this report) to be completely unacceptable for a myriad of reasons.

It is ridiculous that USEPA has already announced their decision on a remediation alternative, which in theory is suppose to address and rectify this particular sites groundwater concerns, even though the extent of these concerns are not yet fully understood by USEPA. I highlight this concern because it has been stated numerous times in the past, by various members of USEPA who have been assigned to this Superfund site, that an additional study is still required in order to fully understand the extent that the polluted groundwater is discharging a seep into the surface water of the Bound Brook.

Thus, since this study of the Bound Brook is currently ongoing and not yet finalized, it makes no sense that the USEPA has gone ahead and presented a proposed a remediation alternative for the groundwater of this site. How can anyone possibly rationalize a solution if they do not first fully understand the problem?

Furthermore, I have found the apathetic attitude of the USEPA members assigned to this case to be even more unsettling. The levels of contamination for the groundwater at this site are too high for the USEPA to sit idly by and not act. Groundwater monitoring at this point in time is not a productive solution for the residents of this community and many members have already spoken out strongly against it. The fact that the USEPA has already failed to identify all of the private wells in the area should provide enough of an insight to how dangerous this situation really is. Numerous residents use these wells on a regular basis to provide water for themselves and their families and risk coming into direct contact with these dangerous chemicals. Additionally, there is a serious concern for vapor intrusion on the hundreds of homes that sit over the 825-acre contaminated groundwater plume. Every home in the plume must be tested in order to assure there is no vapor intrusion into those homes.

I highly recommend that USEPA extends the comment period until the extent of groundwater to surface water contamination in the Bound Brook is determined and the vapor intrusion tests are performed.

Thank you in advance for taking my concerns seriously. If you have any questions, I can be reached at rusbaker@eden.rutgers.edu.

Sincerely,

Russell Baker
908 Dorn Avenue
Middlesex, New Jersey 08846

Public Comment Extension Request
Buono, Sen. D.O.
to:
Diego Garcia
08/17/2012 04:58 PM
Cc:
Judith Enck, Walter Mugdan, Lisa Plevin
Hide Details
From: "Buono, Sen. D.O." <SenBuono@njleg.org>

To: Diego Garcia/R2/USEPA/US@EPA

Cc: Judith Enck/R2/USEPA/US@EPA, Walter Mugdan/R2/USEPA/US@EPA, Lisa Plevin/R2/USEPA/US@EPA

1 Attachment

EWA Remarks.doc

Mr. Diego Garcia
Remedial Project Manager
U.S. EPA Region 2
290 Broadway 19th Floor
New York, New York 10007-1866

Dear Mr. Garcia:

The comment period for the Cornell-Dubilier Superfund Site in South Plainfield, NJ is scheduled to end on August 20, 2012. I urge you to extend the comment period for a minimum of 60 days. The Edison Wetlands Association, an environmental advocacy organization, has brought their concerns regarding this site to my attention. For your convenience, I have enclosed their remarks.

Sincerely,

Barbara Buono
Senator 18th District
BB/pg

NEW JERSEY SENATE

BARBARA BUONO
SENATOR, 18TH DISTRICT
TWO LINCOLN HIGHWAY
SUITE 401
EDISON, NJ 08820
TEL. (732) 205-1372
FAX (732) 205-1375
SenBuono@njleg.org

COMMITTEES:

VICE CHAIR
LEGISLATIVE OVERSIGHT

MEMBER
HEALTH, HUMAN SERVICES & SENIOR CITIZENS

STATE GOVERNMENT, WAGERING, TOURISM & HISTORIC PRESERVATION

Mr. Diego Garcia
Remedial Project Manager
U.S. EPA Region 2
290 Broadway 19th Floor
New York, New York 10007-1866

Dear Mr. Garcia:

The comment period for the Cornell-Dubilier Superfund Site in South Plainfield, NJ is scheduled to end on August 20, 2012. I urge you to extend the comment period for a minimum of 60 days. The Edison Wetlands Association, an environmental advocacy organization, has brought their concerns regarding this site to my attention. For your convenience, I have enclosed their remarks.

Sincerely,

Barbara Buono

Barbara Buono
Senator 18th District
BB/pg

Dear Mr. Garcia,

As an interested party and duly elected representatives in the State of NJ we are extremely concerned about the proposed plan for the groundwater cleanup of the Cornell Dubilier Electronics (CDE) Superfund Site, located at 333 Hamilton Boulevard in South Plainfield, New Jersey.

I immediately urge you to extend the Operable Unit 3 (OU3) Proposed Plan public comment period for a minimum of 60 days.

The United States Environmental Protection Agency's (USEPA) selected remedy to indefinitely monitor the toxic groundwater is absolutely unacceptable. The groundwater contains cancer-causing chemicals such as Polychlorinated biphenyls (PCBs), trichloroethylene (TCE) and cis-1,2-dichloroethylene (cDCE), which are among the 26 chemicals of concern that originate from this site. We strongly believ that the USEPA should conduct a sources removal of the most toxic groundwater and directly under the site and should revisit your flawed plan to monitor the groundwater instead of cleaning it up.

The fact that the drinking water wells are pulling the contaminants towards them from the site and have been since day one disproves EPA's theory that the toxic groundwater plume is bound in the rock formation. Additionally, the USEPA needs to do a better job identifying drink water wells in area as well as testing all the homes within a one mile radius of the site for vapor intrusion.

EPA must grant this extension of time so we can review the voluminous data associated with this site as well as work with community organizations and technical experts to better understand the groundwater and surface water connection as well as the possibility this groundwater is not fully defined. From the USEPA presentation they conducted one rock core for every 200 acres and that appears to be inadequate for the purposes of identifying the 800 plus acres toxic groundwater plume.

In addition, the contaminated groundwater is seeping into the Bound Brook, which travels through South Plainfield and eventually empties into the Raritan River. Because of the high levels of PCBs in the Bound Brook, there is a "Do Not Eat Anything" advisory for all species of fish and shellfish, yet families and children are still exposed to the chemicals from playing and fishing at derbies at New Market Pond.

USEPA announced at the August 7, 2012 public meeting that the extent of this seep from the groundwater into the Bound Brook is still undetermined. In order to have the most effective and efficient cleanup plan, this extent of contamination MUST be determined PRIOR to selecting an appropriate remedy for OU3. For this reason, the comment period must be extended for a minimum of 60 days until this data is collected and available for public review.

Our offices, the Edison Wetlands Association, and the public are strongly requesting a minimum of 60 days. EPA has know about this problem for 25 years and their option for this site is to watch it for another 30 years. Waiting another 2 months will not impact your proposed cleanup option and we expect it to be granted.

If you have any questions, I can be reached at [INSERT CONTACT INFO]. Thank you in advance for taking this request into immediate consideration.

Respectfully,

Bob Spiegel
Executive Director
Edison Wetlands Association
PO Box #1208
South Plainfield, NJ 07080
Phone: (732) 321-1300
Fax: (732) 372-7866
www.edisonwetlands.org

AREA CODE 908

Mayor's Office-226-7601
Clerk-226-7606
Assessing-226-7623
Building Dept.-226-7640
CFO/Administrator-226-7602
Computer Services-226-7649
Emergency Mgmt.-226-7718
Eng./T&M Assoc.-732-671-6400
Environmental-226-7621
Finance-226-7615
Fire Official-756-4761

BOROUGH OF SOUTH PLAINFIELD
2480 Plainfield Avenue
South Plainfield, NJ 07080

AREA CODE 908

Health-226-7630
Library-754-7885
Municipal Court-226-7651
Plan Bd/Bd. of Adj.-226-7641
Police-755-0700
Public Works-755-2187
Recreation-226-7713
Recycling-226-7621
Social Services-226-7625
Tax/Sewer-226-7610
Senior Center-754-1047

August 14, 2012

Mr. Diego Garcia
U.S. EPA Region 2
290 Broadway 19th Floor
New York, New York 10007-1866

Re: Cornell-Dubilier Electronics
Proposed Plan for Groundwater Remediation

Dear Mr. Garcia:

Several members of the South Plainfield Environmental Commission attended the public hearing on August 7 where the EPA's preferred alternative for Operable Unit 3 of the Cornell-Dubilier Electronics Superfund Site remediation was presented. SPEC discussed the proposed plan at its regular monthly meeting on August 8. The members voted to submit the following comments.

The comments made at the public hearing by R. W. Chapin were of considerable interest. Mr. Chapin questioned both the EPA's modeling methods and the assumptions on which the model was based. He questioned whether the nature of the bedrock had been adequately characterized, given the limited spatial distribution of the rock cores. He stated that the EPA model assumes that the bedrock is homogenous, unlike the Leaky Multi-unit Aquifer model that he said has been shown to be accurate at other sites. He said he could find no data that showed the EPA's discrete fracture network approach to contaminant transport had been verified by comparison of predicted results with actual field measurements. He did not consider groundwater samples to be an adequate substitute for taking additional rock cores to test the predictions, and questioned the accuracy of the EPA estimate of the rock matrix diffusion rate. He stated that it is important to quantify the entire mass of TCE residing in the bedrock as well as the full extent of the contamination.

Since conclusions about the persistence of the contamination and its resistance to extraction seem to depend on the matrix diffusion rate as well as on the total amount of contaminant present in the aquifer, these seem to be key points that need clarification.

SPEC does not support the choice of Alternative 2, to protect public health only with institutional controls and monitoring of contaminated groundwater and vapor emission. Additional study by a third party using a different model might come to different conclusions about the feasibility of cleaning the aquifer.

Moreover, mitigation that cannot be accomplished in the near term might be accomplished over time. Principles of sustainability suggest a reasonable timeframe should be extended beyond the standard thirty-year EPA benchmark, even into centuries if necessary. If nothing is done to remove the TCE from the groundwater, it will certainly still be there three hundred years from now. Will the population residing here in 2312 remember that they are not supposed to dig wells?

Thank you for the opportunity to comment on the proposed plan.

Sincerely,

Dorothy Miele

Dorothy Miele
Chairwoman

Alice S. Tempel

Alice S. Tempel, Ph.D.
Environmental Specialist

Cc: South Plainfield Mayor and Council

Written comments - CDE OU3 Proposed Plan - please confirm receipt
Todd A. Muccilli
to:
Diego Garcia
08/19/2012 09:04 PM
Cc:
Pat Seppi
Hide Details
From: "Todd A. Muccilli" <tmuccilli@yahoo.com>

To: Diego Garcia/R2/USEPA/US@EPA

Cc: Pat Seppi/R2/USEPA/US@EPA

Please respond to "Todd A. Muccilli" <tmuccilli@yahoo.com>

History: This message has been replied to and forwarded.

1 Attachment

Muccilli March 2011 sampling.pdf

Mr. Garcia,

I am a South Plainfield resident located approximately 1.5 miles north-northeast of the CDE site. My family and I drink water from a private well on our property (our only source of potable water) that has shown the presence of the very same volatile organic compounds identified as key contaminants at the CDE site and within the groundwater plume, including TCE and DCE. These written comments serve as a follow-on to the verbal comments I provided at the August 7 public meeting.

I have read the extent of the OU3 administrative file and while I fully understand the challenges associated with the groundwater remediation, and am generally supportive of the Preferred Alternative identified, I believe it falls short of ensuring effective long-term exposure control for all residents, including myself, who are affected by the contamination.

There are several contradictions related to extent of contamination in the reports, and a lack of detail surrounding the institutional controls, that raise doubts to me that the proposed measures will adequately manage exposure to the contamination over an extended period of time.

Specifically, the extent of contamination does not appear to be adequately delineated to ensure robust monitoring and exposure control:

- The boundaries of the OU3/TI Extent area (the same area suggested for monitoring and institutional controls) are based upon theoretical extrapolation of sampling data to the 1 μg/L isoconcentration level. The theoretical extrapolation cannot confirm that the groundwater TCE concentration beyond this boundary is less than 1 μg /L, the current New Jersey drinking water standard. The boundaries of the contaminated area should be validated by field test results.
- The sampling data presented in the reports (Tables 5-19 through 5-21 of the RI) for the MWC Park Avenue wellfield reflects levels of TCE above 1 μg/L and confirms that this region is contaminated at levels higher than those described by the theoretical extrapolation presented in the reports. This field data suggests that the northern boundary of the OU3/TI Extent area (which has been set just south of this region) has been arbitrarily located.
- Despite the field data obtained from the MWC, the Park Avenue wellfield and surrounding area was excluded from the OU3/TI Extent area based upon "other sources of similar contaminants within or near the study area". The lack of detail regarding the "other sources" specifically affecting the MWC Park Avenue wellfield, and the relatively distant locations of these other potential sources (as identified in Figures 5-34 and 5-35 of the RI report), do not provide a compelling justification for this exclusion.
- My personal well monitoring data (see attached summary) reflects detectable levels of TCE and DCE in a private well located outside the OU3/TI Extent area. The conclusion from the RI and proposal that the "plume is not currently expanding" is dependent on many variables that may change over time and offers little confidence to someone like me – situated just outside of the current OU3/TI Extent area – that I will not see a change in the quality of my drinking water at some point in the future. In order for the proposed countermeasures to be effective, accurate delineation of the extent of contamination, with incorporation of a reasonable margin of safety, should be considered.

Likewise, the proposal is light on detail about the institutional controls that will be implemented and this makes it difficult to assess how well the Preferred Alternative will safeguard against health effects from the groundwater contamination. The Preferred Alternative is a conservative approach to address this significant and widespread contamination (relative to the other alternatives investigated and described); however, the steps taken as part of this alternative should be as aggressive as possible to effectively meet the exposure control objectives outlined and to completely prevent risk to human health. Specifically, the following measures would offer more assurance to the residents:

- Additional measures should be taken to identify active potable drinking water wells in the town of South Plainfield. As the reports note, existing databases are inadequate to identify older private wells. There are several residents in my neighborhood who are still utilizing a private well, despite the fact that municipal water is available in the area. None were aware of the extent of contamination associated with the CDE site.
- Ongoing monitoring efforts should encompass not only existing monitoring wells, but should also include groundwater sampling at the limits of an appropriately scoped area, as described above, including frequent sampling of any active potable wells identified in the area. Any concerned South Plainfield residents who are utilizing a private well should be offered routine monitoring, regardless of their location in relation to the CDE site.
- Any resident utilizing a private well for drinking water that is found to have contamination at a level exceeding current drinking water standards should be provided a connection to the municipal water system, at no expense to the resident. This is an effective way to mitigate contact with the

contamination and should be factored in to the cost estimate of the Preferred Alternative.
- The proposal should also consider the potential that additional drinking water wells might show contamination over time and should incorporate the necessary contingency to address them as they are identified.

I urge you to consider these comments and suggestions as you finalize the proposal for addressing the CDE groundwater contamination. The residents of South Plainfield are being asked to accept the “technical impracticability” of remediating the contaminated groundwater associated with the CDE site; they are due, in turn, the most aggressive and robust solution that guarantees effective exposure control for the long term. It is incumbent upon the EPA to adequately strengthen the Preferred Alternative to ensure that this is the case.

Regards,
Todd A. Muccilli
2133 Audubon Avenue
South Plainfield, NJ 07080
(909) 756-6837